Telephony

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STORY OF THE STATES—ILLINOIS

The First of a Series dealing with the Telephone Development of the States

By E. J. Mock

ILLINOIS furnishes a splendid example of the wonderful progress made by the Independent telephone movement. Over the fertile plains of the "Prairie State" the wires of the Independents reach in every direction, and they have contributed their share to give Illinois her prominent place in the sisterhood of states as a commercial and industrial empire. At the present time Independent telephony is knocking at Chicago's door with no uncertain sound, and the welcome extended by the people of that great city is a strong omen that ere long the territory so long held in the grasp of the Bell trust will be thrown open to Independent competition.

In the manufacture of telephone apparatus, Illinois to-day leads the world, as it has in the past, and as it will no doubt continue to do in the future. It was in Illinois where Independent telephony had its inception; where most of the litigation against Independent manufacturers by the Bell company was fought out, and where the earliest Independent exchanges were started. It is but natural, then, that "Illinois" should be made the first chapter in TELEPHONY'S "Story of the States."

Happily, to tell the telephone story of Illinois, it is not necessary to go back to the year 1818 when the state was admitted to the Union. The real story begins in 1892, and in this one essential, Illinois holds no advantage over many of the other states. All Independent telephone narratives have a common beginning, and this beginning dates from the expiration of certain fundamental patents that were owned by the Bell company.

Any record concerning the telephone, however, must necessarily suggest something of the invention itself. No man, upon examining the first crude piece of apparatus, could possibly have conceived the industrial importance of the new device making speech transmission possible. The stimulation of internal and external commerce which was due to the innovation, will never be fully realized because we can have no conception of what conditions would have been without it. The telephone, as we are familiar with it, is but thirty years old, and yet its benefit to the entire world is of such startling magnitude that it is not possible, even now, to comprehend the debt we owe to the instrument and the men who designed and developed it. Realizing partially the progress the telephone industry has made during the past decade, a glimpse into the future, based upon the record thus far made, fairly staggers the imagination.

The use of the telephone is responsible for an almost complete transformation in methods of business, inaugurating practically an entirely new era in the conduct of affairs. That the inhabitants of large cities do not fully realize this, is borne out by an illustration offered by a successful rancher man in the west, who had not visited Chicago for a period of ten years. He remembered vividly the street congestion of earlier days, and, being familiar with the city's tremendous growth, the anticipated visit held little charm for him. His first remark after reaching the city naturally had bearing on this point, and he was agreeably surprised to observe fewer people on the streets to-day than he had ever before noted. He was prompt to attribute the improved condition to the telephone, remarking as he did so, that to the telephone must be given the credit of saving a vast amount of life energy because of the instantaneous interchange of intelligence it provides.

The value of the instrument is not restricted, however, to purely local fields. While its greatest benefit no doubt accrues to isolated communities, the long distance feature has an enormous value, best known where its use is essential and urgent. The element of time is becoming more and more important, and the expense of travel to accomplish business at distant points is made unnecessary by the use of the telephone. With the present facilities, the longer the distance the greater becomes the economy of transacting business by this means. The rate charged for the service is purely nominal when all conditions are considered.

Those of us who are in the business may sometimes be charged with being too enthusiastic over telephone possibilities, but when all the factors are brought together, little argument is required to prove that the invention making possible this quick interchange of conversation stands easily first, as the most important single addition to the general equipment of the industrial world.

We are told that invention is full of romance. A noted author has written a volume on the romance of the development of the telephone industry. This writer has shown that against tremendous odds, the present substantial Independent telephone fabric of organization has developed from very humble beginnings and in out-of-the-way places. It would hardly be possible to find in history the accredited record of any sovereign who governed with a more absolute disregard for all principles and practices of constitutional liberty and business sense, than has prevailed with the American Telephone & Telegraph Company, the Bell octopus. Despite all disadvantages, difficulties and seeming impossibilities, the Independent telephone manufacturers and operators have triumphed against one of the most powerful corporations in the world.

It is apparent that the one essential principle in the development of public service companies requires that different and competing methods of transmission should be under different ownership. There has been an increasing disposition to forbid steam railways to own trolley lines. This

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sentiment is based on the ground that the mechanical improvement of the two kinds of vehicle is promoted by competition. It is well known that the development of the telephone industry has been due wholly to the fact that the two means of communication, Independent and Bell, were competitive. English writers acknowledge that telephone service has been slow in development, because the British government controls the telegraph in connection with the postal service, and has not looked with favor on a system that would take business from its other intelligence distributing agencies. There should be some satisfaction for Americans to know that in England there is a valid reason for stifling competition. In the United States, during an uninterrupted period of seventeen years the Bell monopoly had no reason that has ever become known for limiting service to a maximum of two hundred and forty thousand stations. The financial student of conditions in the United States must agree that there exists in some of the great corporations the seeming paradox that they have their picayunish side. There are frequent occasions when tremendous aggregations of brains and capital, that overawes all competitors, are compelled by stress of circumstances to do things that would put to shame an unpretentious country merchant, but it is seldom that a vast monopoly will totally ignore the appeal for service of millions of prospective customers.

The Bell monopoly held to the theory that its position was impregnable. It still persists that the single telephone system is ideal—that a dual system is a nuisance—emphasizing that two systems mean "divided service; increased expense; two bells; two bills; two books!" Independents are familiar with the slogan. Following this stereotyped declaration is the time-worn interrogative: "If two systems are a good thing, why not six or eight?"

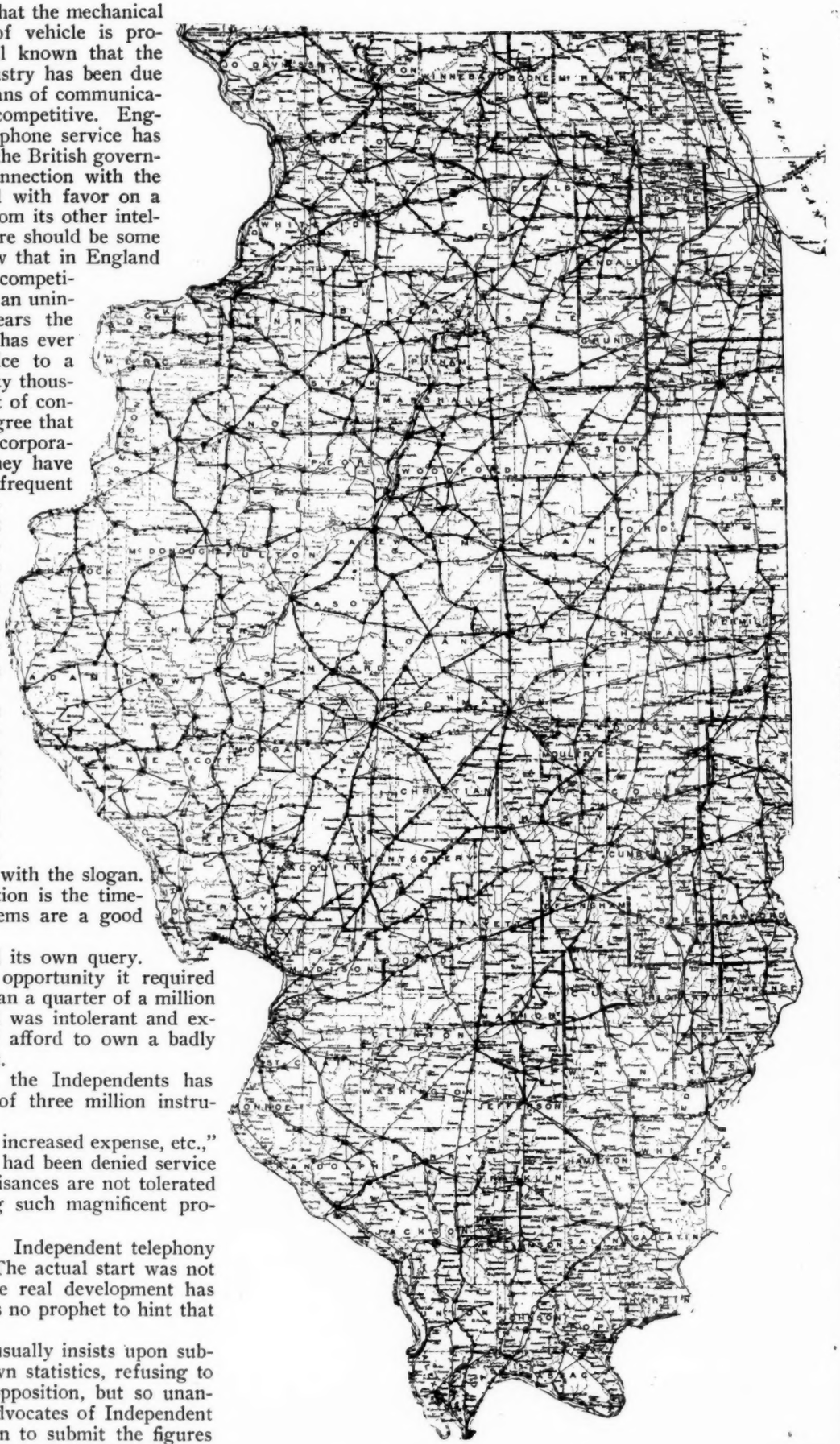
The Bell company has answered its own query. With one system and undisputed opportunity it required nearly two decades to install less than a quarter of a million instruments. The service rendered was intolerant and expensive. None but the rich could afford to own a badly constructed and obsolete instrument.

A competitive system built by the Independents has reached an installation in excess of three million instruments in less than twelve years.

The bugaboo of "divided service, increased expense, etc.," held no terrors for the people who had been denied service at the hands of the monopoly. Nuisances are not tolerated nowadays to the point of reaching such magnificent proportions.

And the industry is only begun. Independent telephony had its first opportunity in 1892. The actual start was not much in evidence until 1896. The real development has been made in ten years! It requires no prophet to hint that its maturity has not been reached.

In most controversies each side usually insists upon submitting its own evidence and its own statistics, refusing to give any publicity to that of the opposition, but so unanswerable is the contention of the advocates of Independent telephony that they are willing even to submit the figures of the Bell trust. For that reason, attention is called to



Map of Illinois showing Independent exchanges and connecting toll lines.

the accompanying diagram which appeared in the annual report of the directors of the American Telephone and Telegraph Company to its stockholders for the year ending December 31, 1905—one year ago:

This diagram shows the growth in subscribers' stations connected with the Bell system from January 1, 1876, to January, 1906, a period of thirty years, ranging from the inception of the first telephone, through the years when the Independents began to press their monopolistic rival, down to 1906 which furnishes the latest available statistics.

A study of this diagram is the most eloquent argument possible of the contention that the birth and subsequent development of Independent telephony have compelled the Bell to do whatever it has done to popularize the telephone.

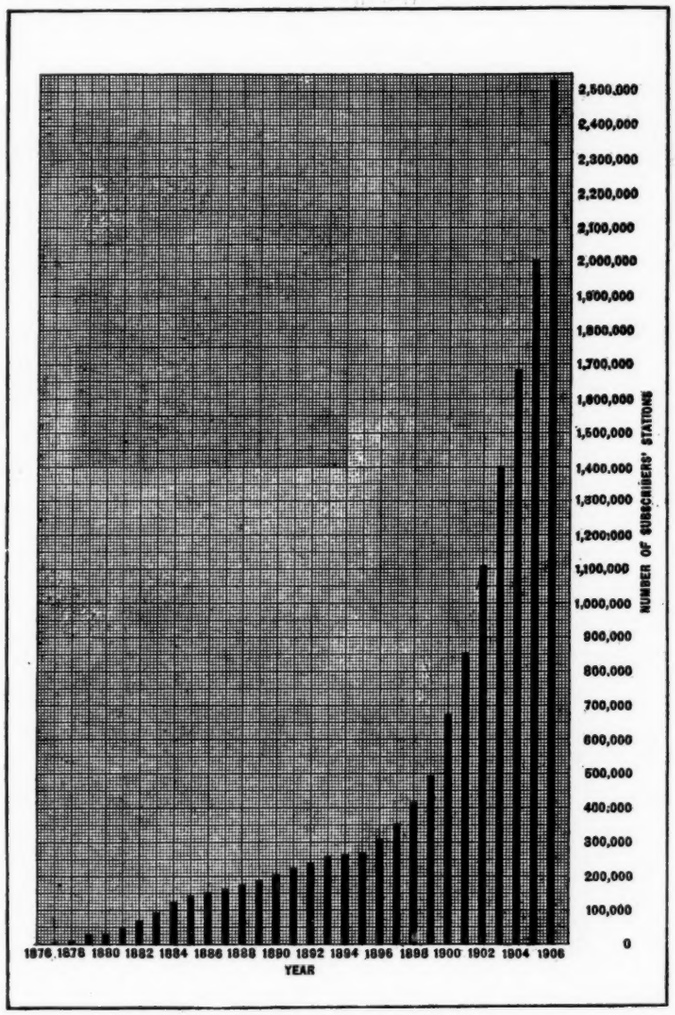


Diagram showing Bell instrument installation by years.

Look at the figures as given by the Bell's own directors:

From 1876 to 1896, twenty years, when the Bell had no competition, the number of telephones grew only to a beggarly 300,000! That was a snail's pace for any industry in the United States, the land of hustle, energy and enterprise. In 1896 the Independents entered the field, and note what happened. In two years the Bell increased its number of telephones 100,000. In six years there was an increase of 375,000, and so the record grows, every two years showing a still larger gain until 1906 when the total reached 2,500,000.

What caused this phenomenal change that made the rate of increase leap from 300,000 in twenty years to 2,200,000 in ten years? The answer is written as plain as day in the Bell company's own diagram. From 1876 to 1896 the Bell had the field to itself. The monopoly gave the people what it wanted to give them, not what they wanted to get, and in consequence the demand for telephones was at a low ebb. Following the entrance of the Independents there was a transformation nothing short of cyclonic. They infused the telephone world with an energy and spirit that would make an athlete out of a tottering invalid. Within four years after the Independents began operations the number of Bell telephones increased more than it had during the

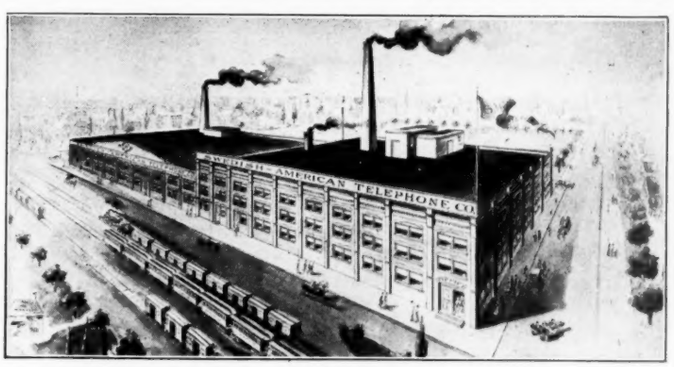
American Electric Telephone Company, Chicago.

twenty years when there was no competition—and the Bell diagram proves it. And that was only a starter. Year by year the number grew. The stronger the Independents became the more concessions the Bell had to make, with the inevitable result that more people wanted and got telephones. Here are the approximate figures from year to year:

	Telephones.
1896—Bell had	300,000
1897—Bell gained	50,000
1898—Bell gained	60,000
1899—Bell gained	75,000
1900—Bell gained	180,000
1901—Bell gained	180,000
1902—Bell gained	250,000
1903—Bell gained	300,000
1904—Bell gained	280,000
1905—Bell gained	320,000
1906—Bell gained	550,000

In one year, then, Independent competition made the Bell gain nearly double the entire number of telephones it installed during twenty years from 1876 to 1896.

The irresistible energy and intelligent enterprise of the



Swedish-American Telephone Company, Chicago.

Independents have brought about this wonderful condition.

Competition following the development of the Independent movement has resulted in lower rates, better service and new uses of the telephone, and they in turn have doubled and trebled the number of instruments many times over. In short the Independents have popularized the telephone as has no other agency, and the Bell diagram proves it.

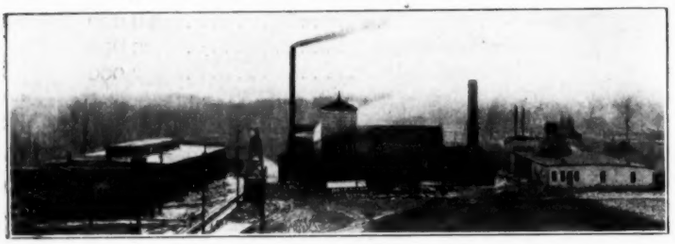
To-day there is one telephone in the United States for every sixteen people. In 1894, before the Independents took the field, there was one for every 230. It is estimated that $600,000,000 is invested in the telephone business, and the gross earnings are believed to exceed $150,000,000.

In Illinois there are approximately 2,500 cities, towns and villages. The Independents have exchanges in nine hundred

Automatic Electric Company, Chicago.

and ninety-six of these places. Three-fifths of the towns have local organizations and these central exchanges operate sub-exchanges in the remaining two-fifths of the total.

Accompanying this article is given partial information concerning one hundred and ninety-five Independent exchanges and sub-exchanges. Bell literature refers to these as "so-called Independents." The Bell company parades its figures as being exact, and designates the statements of Independents as "wild estimates," or "gross exaggerations." It depends upon the government's initial effort to compile statistics concerning the telephone—a work conducted by the Bureau of Commerce and Labor under the direction of Mr. W. M. Stewart. This effort was made in 1902 and resulted badly for the Independents, giving them credit for



American Carbon & Battery Company, East St. Louis.

a trifle less than a million instruments as against the Bell's 1,317,178 stations. In the Department of Commerce and Labor's report, telephone systems were divided into three classes, commercial, mutual and Independent farmer, or rural lines. The commercial systems reported 93.9 per cent; the mutuals 3.8 per cent, and the rural lines 2,3 per cent. Those of us who are closely allied to the Independent industry will readily understand why the Bell company shared the greater honor in this first compilation. The department also offers this bit of consolation which we are pleased to quote:

"There was great activity, during 1902, in the formation of new companies and the consolidation of existing systems. As these changes made it difficult to collect reliable information, especially for the mutual companies and Independent owned lines, it is probable that in some respects the data are incomplete. * * *"

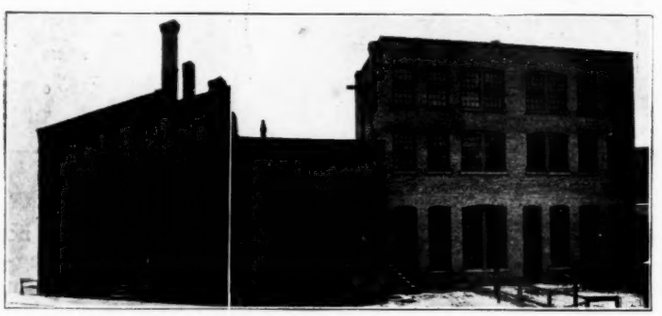
It will be noted that the foregoing has not been quoted from Bell literature. Bell figures are exact, but they are prepared to suit the exacting caprices of the New England press bureau! Furthermore, they are designed with great care to appeal to financial men who do not always exercise the best judgment in placing investments. These figures always show the extreme cases and are meant invariably to boost Bell securities. One seldom if ever finds any mention of such cases as that of Galesburg, although Galesburg concedes that the Bell company has added 171 instruments while it installed 2,845! And of these 2,845 subscribers, 517 use the Bell service; or putting it another way, of the Bell's total installation of 871 instruments, 517 are on the wall beside Independent instruments.

The record shows that the Bell company operates 205 exchanges in Illinois. Of these the Chicago Telephone Company operates 111; the Central Union Telephone Company, with headquarters at Indianapolis, operates eighty-five; the Missouri & Kansas Telephone Company, St. Louis, operates three, and the Cumberland T. & T. Company, Nashville, operates six. The stock of all these sub-licensee Bell concerns is controlled by the American T. & T. Company, New York. The parent concern holds 52.04 per cent of the Chicago, 76.76 per cent of the Central Union, 53.72 per cent of the Missouri & Kansas, and 52.09 per cent of the Cumberland. The opposition to Independent enterprise is there-

Eureka Electric Company, Genoa.

fore all foreign. Every dollar paid for the service contains its tribute for the parent Bell corporation and its $250,000,000 of inflated values.

The Bell telephone monopoly existed for so many years without opposition that it formed certain habits that are now difficult to overcome. It pretends, even now, that Independent telephony is merely a "promoter's proposition." Having always been safe in its own statements with reference to instrument output and the like, it would not care to parade facts concerning the Independents. For years it has pooh-poohed the stability of Independent enterprise, because the Independents have been so busy financing and building systems against every obstacle the Bell could place in their way that no time was left to gather refuting evi-

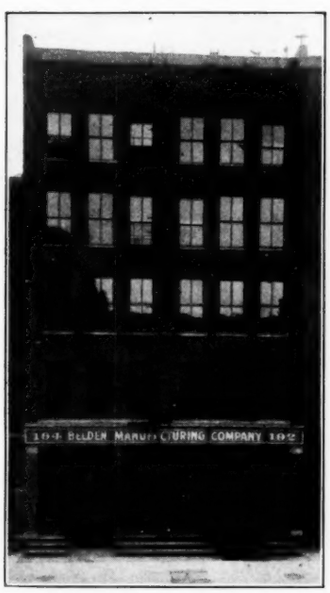


M. Kline & Sons, Chicago.

dence. But the labor of installing Independent exchanges has gone steadily forward, nevertheless, until the Bell company now finds itself afflicted with a chronic hard-up-ness that cannot be shaken off. The reasons are very apparent. Besides a capitalization of $250,000,000, of which $158,661,800 is outstanding, there is a bonded debt of colossal amount. There must be paid on its oustanding capital an interest rate of 7½ per cent per annum. The bonded

Western Telephone Manufacturing Company, Chicago.

Illinois Electric Company, Chicago.



Belden Manufacturing Company, Chicago

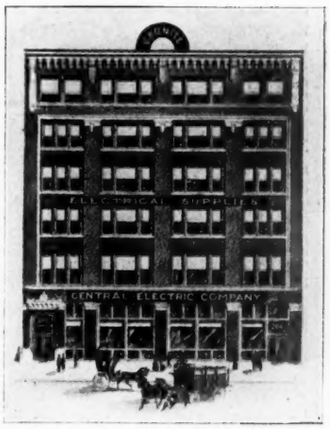
Electric Appliance Company, Chicago.

debt includes $78,000,000 collateral trust mortgage 4 per cent bonds; $10,000,000 American Bell Telephone 4 per cent debentures; $20,000,000 3-year-gold 5 per cent coupon notes, and a comparatively new issue of $100,000,000 convertible 4 per cents—which are giving the underwriters no end of trouble to place—making a total of $208,000,000 upon which interest is a fixed charge.

Early in the present year the financial journals were dinning into the public ear that the American T. & T. Company derived its income from four main sources, emphasizing as one of these the importance of interest derived from money loaned to its sub-licensees. It is common knowledge that the parent company has cut off some of its fond proteges in this respect, and is not loaning them any more money. Right now it seems to be in the collection business on a very large scale. The reason is always apparent—the sub-licensee companies are feeling the effect of Independent competition without deigning to acknowledge it.

The accompanying table, which has been compiled from data supplied over the signatures of Independent operators shows most clearly that competition is beginning to tell and that the rumble has been felt as far away as the Atlantic seaboard. One hundred and nineteen exchanges in Illinois show a capitalization of $5,264,930 and 75,887 instruments. The Bell company alleges that the Independents are promoters and stock-jobbers, but this illustration alone shows that the per capita cost per instrument is less than seventy dollars! The American Telegraph and Telephone Company claims an installation of 2,500,000 instruments capitalized at $100 per station—which does not contemplate its enormous bond issues that have been previously enumerated.

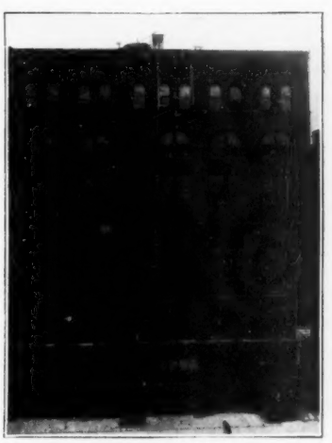
TOWN—	Number Bell Instruments Before Competition	Number Bell Instruments Now	Incorporated or Established	Capital	Number Instruments Installed	Business Instruments	Residence Instruments
Abingdon	15	15	1902	10,000	302	100	202
Adrian	3	3	1904	2,500	70	3	67
Aledo	1	0	....	35,000	900	100	800
Altamont	0	0	1901	8,000	205	20	185
Altona	..	..	....	.....	250	25	225
Anchor	..	1	1904	1,320	114	...	...
Andover	..	..	....	.....	100	...	...
Arrowsmith	1	1	1903	4,000	235	19	216
Ashton	..	..	1903	5,000	275	65	210
Astoria	6	50	1900	.....	225	50	175
Athens	..	..	....	.....	256	30	226
Atkinson	1	1	1899	8,500	425	50	375
Bellflower	..	..	....	.....	148	15	133
Biggsville	..	..	1904	7,500	250	16	234
Bloomington	..	..	1897	50,000	99	47	52
Bluffs	..	..	....	.....	200	20	180
Bradford	3	3	1901	20,000	925	...	...
Breese	..	..	....	20,000	327	250	77
Brighton	18	1	1902	.....	224	30	194
Brownstown	..	..	1905	5,000	229	40	189
Bruce	..	..	1905	2,500	65	8	57
Bunker Hill	..	50	1898	10,000	288	62	226
Bushnell	1	1	....	10,000	281	61	220
Cabery	0	0	1903	6,000	192	32	160
Bushnell	..	..	....	.....	276	66	210
Cairo	..	..	1895	5,000	700	300	400
Caledonia	1	1	1902	15,000	270	40	230
Camp Point	..	..	....	.....	250	75	175
Campus	1	1	1905	2,500	150	25	125
Canton	400	450	1902	75,000	900	200	700
Carbondale	..	..	1902	5,000	274	100	174
Carlinville	..	..	1900	10,000	300	60	240
Carthage	..	..	1904	50,000	350	70	280
Casey	1	1	1897	35,000	985	147	738
Chadwick	..	..	1902	150,000	300	100	200
Champaign	..	..	....	3,000	1,300	...	...
Charleston	..	..	....	.....	600	190	410
Chauncey	..	..	1905	.....	306	6	300



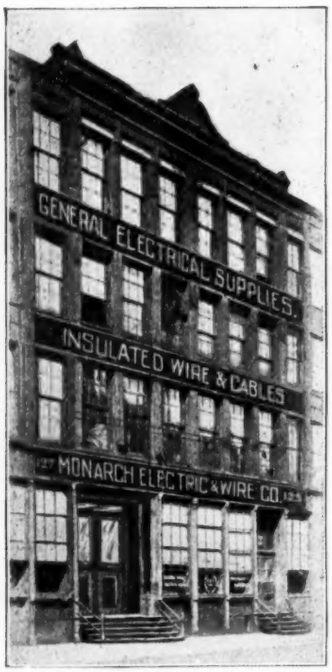
Central Electric Company, Chicago.

Baird Manufacturing Company, Chicago.

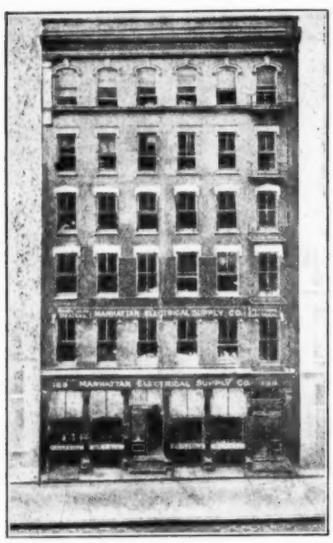
Moon Manufacturing Company, Chicago.



Runzel-Lenz Electric Manufacturing Company, Chicago.



Monarch Electric & Wire Company, Chicago.



Manhattan Electrical Supply Company, Chicago.

Roth Bros. & Company, Chicago.

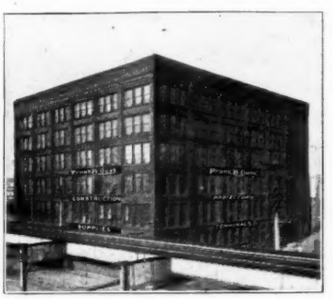
Holtzer-Cabot Electric Company, Company.

Chester	..	..	1898	5,000	450	150	300
Chesterfield	..	..	1903	15,000	300	30	270
Chillicothe	..	..	1901	20,000	580	78	502
Cissna Park	..	..	1904	.....	200	...	...
Clinton	100	3	1904	100,000	2,500	1,000	1,500
Colfax	..	..	1906	12,000	358	42	316
Colterville	..	..	1904	.....	80	...	...
Concord	..	..	1903	16,000	400	...	...
Corinth	..	..	1901	2,000	150	15	135
Cuba	..	..	....	.....	65	20	45
Dahinda	..	..	1902	10,000	180	...	...
Dahlgren	0	16	1902	10,000	300	35	265
Danvers	..	..	....	.....	392	39	353
Deer Creek	..	..	1900	10,000	380	50	330
Delavan	..	185	....	.....	306	...	...
Des Plaines	..	..	1900	10,000	153	20	133
Dix	1	0	1900	.....	262	12	250
Dixon	150	250	1896	100,000	1,300	400	900
Dongola	..	..	1906	2,500	96	10	86
Duncan	..	..	....	5,000	125	2	123
East Lynne	..	..	1904	34,000	180	30	150
East Peoria	..	102	....	.....	102	...	...
Edinburg	60	12	1903	.....	550	160	390
Effingham	..	..	1906	30,000	225	...	...
Elkhart	3	3	1902	1,250	117	14	103
Elliott	..	..	1902	6,000	225	15	210
El Paso	156	0	1902	10,000	697	60	637
Elwin	0	1	1902	.....	130	3	127
Emington	4	2	1902	1,500	170	20	150
Esmond	..	..	....	.....	45	3	42
Eureka	..	..	....	5,000	150	35	115
Fairview	..	..	....	.....	400	...	...
Fayette	..	..	....	.....	70	4	66
Findlay	..	..	1904	2,400	205	25	180
Forest City	..	..	1902	20,000	200	25	175
Freeport	660	560	1902	150,000	1,725	525	1,200
Galesburg	700	871	1902	250,000	2,845	733	2,112
Galva	..	..	....	.....	378	...	...
Geneseo	375	300	1900	.....	900	150	750
Gillespie	..	..	1903	.....	335	68	267
Golconda	..	..	1898	5,160	130	...	...
Golden	..	..	1904	5,000	132	...	...
Grayville	..	..	1905	4,000	307	23	284
Green Valley	..	1	....	.....	286	...	...
Greenview	..	..	....	.....	79	15	64
Gridley	1	1	1906	1,600	...	...	...
Hamilton	110	0	1904	.....	301	75	226
Havana	200	5	....	.....	546	...	...
Hennepin	..	..	....	.....	42	...	...
Hillsboro	..	..	1902	.....	1,250	...	...
Hinckley	..	..	1904	.....	270	35	235
Homer	..	..	1899	.....	375	100	275
Houston	..	..	1900	1,500	464	4	460
Hume	..	..	....	.....	219	19	200
Industry	0	0	1901	.....	520	60	460
Jacksonville	..	..	1897	500,000	3,900	...	...
Joslin	..	..	1903	10,000	400	...	...
Kankakee	550	575	1903	500,000	1,900	325	1,575
Kempton	..	..	1902	1,200	40	...	...
Kewanee	..	..	1903	125,000	1,702	365	1,337
Kinmundy	..	..	....	.....	245	25	220
Kirkwood	..	..	1904	7,500	215	20	195
Lacon	..	1	....	.....	286	...	...
La Harpe	..	..	1904	.....	167	55	102
Latham	2	2	1901	10,000	252	22	230
Lawn Ridge	..	..	1905	21,000	300	20	280
Leaf River	1	1	1906	4,500	135	24	111
Lexington	190	180	1905	20,000	360	50	310
Liberty	..	..	1901	18,000	650	50	600
Lincoln	200	25	1903	110,000	1,200	450	750
Louisville	..	..	1900	.....	302	32	270
Macon	..	..	....	.....	325	...	...
Manito	134	1	....	.....	260	...	...
Manhattan	..	..	1902	5,000	315	261	54
Martinsville	..	..	....	.....	600	...	...
Metamora	13	0	1901	3,000	270	16	254
Metropolis	..	..	....	.....	250	...	...
Moline	..	..	1899	550,000	1,680	...	...
Monmouth	..	..	1899	50,000	1,300	200	1,100
Morton	..	..	1899	10,000	700	100	600
Morrison	0	0	1903	10,000	450	50	400
Mt. Pulaski	..	..	....	50,000	600	50	550
Mt. Sterling	..	..	....	.....	195	80	115
Mt. Vernon	..	..	....	50,000	5,000	...	...
Mt. Zion	0	1	1900	.....	275	10	265
Nauvoo	..	..	....	.....	500	100	400
Neoga	..	..	1901	2,500	310	85	225
Neponset	..	..	1899	20,000	300	15	285
New Haven	..	..	1902	.....	110	20	90

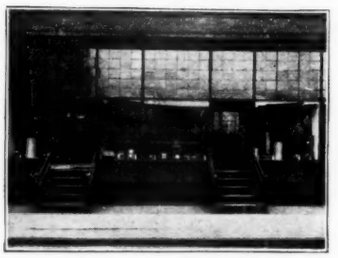
Monarch Telephone Mfg. Company, Chicago

Stromberg-Carlson Telephone Manufacturing Company, Chicago.

Sandwich Pole Changer Company, Sandwich.



Frank B. Cook, Chicago.



Farr Telephone & Construction Supply Company, Chicago.

New Holland	1	1	1904	2,500	125	30	95
Newman	..	..	....	.....	150	40	110
New Windsor	..	..	....	.....	260	...	...
Niantic	30	20	1900	.....	230	28	202
North Henderson	..	..	....	.....	285	20	265
Nunda	..	..	1902	15,000	96	45	51
Oakford	..	..	....	.....	105	7	98
Oakland	..	..	....	45,000	375	50	325
Olney	..	..	1896	25,000	375	...	...
Osco	..	..	1895	.....	86	4	82
Pekin	934	320	1901	85,000	1,399	274	1,125
Perry	0	0	1903	.....	400	19	381
Petersburg	1000	700	1905	100,000	481	65	416
Piper City	..	..	....	8,000	242	30	212
Pittsfield	0	0	1897	65,000	1,250	125	1,125
Pleasant Plain	..	..	1901	60,000	870	...	...
Princeton	110	15	1899	120,000	5,200	850	4,350
Princeville	..	..	....	.....	318	50	268
Rankin	..	..	1904	34,000	251	30	221
Reddick	42	30	1903	10,000	248	40	208
Reynolds	..	..	1902	.....	100	45	55
Roberts	..	..	....	.....	236	...	...
Robinson	..	..	1902	25,000	560	100	460
Rochelle	..	..	....	100,000	1,900	...	...
Rockford	..	..	1902	200,000	1,700	...	...
Rock Island	..	..	....	.....	2,014	...	...
Roseville	..	..	1902	2,000	490	20	470
Rossville	1	1	1898	.....	701	183	518
Rushville	..	..	1897	.....	350	...	...
Rutland	..	..	1900	30,000	111	20	91
Sciota	..	..	....	.....	328	8	320
Scottville	..	..	1902	.....	215	25	190
Sibley	1	..	1902	12,000	176	...	...
St. Anne	..	..	....	.....	57	...	...
St. Joseph	..	..	1904	18,000	300	75	225
Salem	..	..	....	.....	1,530	82	1,448
Sandwich	..	..	1898	250,000	2,500	400	2,100
Savanna	500	50	1902	150,000	2,600	...	...
Shelbyville	..	..	1884	35,000	230	...	...
Spring Grove	..	..	1906	10,000	100	28	72
Springerton	..	..	1901	2,500	200	25	175
Stewardson	..	..	1902	5,000	265	24	241
Streator	..	..	....	.....	1,750	...	...
Stronghurst	..	..	1900	.....	140	...	...
Sullivan	..	..	1901	.....	235	...	...
Sycamore	..	..	1895	150,000	2,025	390	1,635
Tallula	..	..	....	.....	229	30	199
Tamaroa	..	..	1906	2,500	300	40	260
Tampico	1	1	....	6,000	352	30	322
Temple Hill	..	..	1904	2,500	105	...	...
Texico	0	0	1897	.....	65	...	65
Tremont	..	..	1901	12,000	110	...	...
Troy	5	1	1900	10,000	181	100	81
Tuscola	..	..	1904	10,000	175	125	50
Vermillion	..	..	1903	500	100	...	...
Victoria	..	..	....	.....	27	...	...
Virden	..	..	....	.....	250	...	...
Warrensburg	..	..	1901	5,000	206	75	131
Washburn	..	..	....	.....	223	50	173
Washington	..	..	1903	10,000	200	...	...
Wataga	..	..	....	.....	65	...	...
Waterloo	..	..	....	25,000	210	...	...
Waverly	..	..	1895	50,000	1,560	...	...
Wenona	..	..	1900	30,000	230	40	190
Westfield	..	..	1900	.....	102	...	...
Williamsville	..	..	1904	2,500	60	..	...
Wing	..	..	....	1,000	87	4	83
Wyoming	..	..	1904	25,000	343	40	303

Of fifty-two Independent company reports that have given the Bell installation before competition, as well as the Bell installation at present, the important fact is further developed that competition is being keenly felt. In fifty-two towns before the advent of Independent telephony, the Bell served 6,584 subscribers, whereas it now serves but 4,473 subscribers—a clear loss of 2,111. In these same towns the Independents have installed 29,601 instruments while the Bell was losing over 2,100.

Of the entire 195 accompanying reports, seventy-five do not include capitalization. The majority of these seventy-five represent unincorporated organizations. Some of the companies, as in the case of Pekin, operate in other points besides the number indicated locally. Pekin, for example, includes in its system the exchanges at Delavan, East Peoria, Green Valley, Lacon, Manito and Havana.

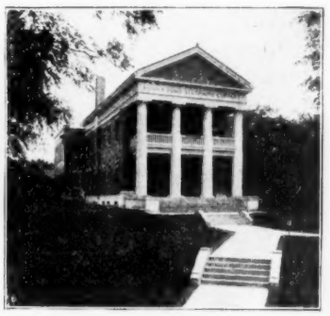
In the case of Biggsville and Kirkville, which are operated by one company, we have split a capitalization, assigning one-half of $15,000 to each town.

It would be difficult to present a table showing the actual condition of the Independent telephone industry of any state, because it would require a town to town canvass and before such a campaign could be finished so many changes would have occurred that another would be necessary.

There are some remarkable developments yet to result but past accomplishments are quite satisfactory. In the counties of Bureau, Brown, Carroll, Christian, De Kalb, De Witt, Knox, Lee and Logan, the Bell company operates but 2,880 telephones as against 26,000 Independent telephones.

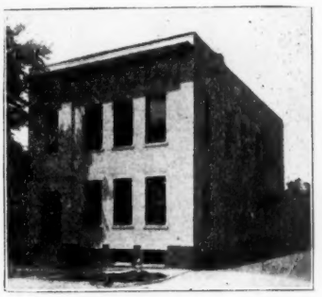
The Independent telephone business is not a hard and fast commercial proposition by any manner of means. It furnishes service to a class of citizens who had been denied Bell telephone service. In counties where four or more ex-

Union Telephone Company, Galesburg.



Home Telephone Company, Quincy.

Eastern Illinois Independent Telephone Company, Kankakee.



Wabash Valley Telephone Company, Paris

changes exist, it is common practice to arrange unlimited service over the lines of all for the subscribers to each. It is not a cold-blooded proposition of calling for a number and hearing the pleasant voice of a switchboard operator call back, "Drop a nickel, please." There are thousands of telephones in use in this state which are installed because of Independents and in spite of the Bell.

The "wildest exaggeration" as the Bell unfairly terms Independent statistics, has placed the number of Independent telephones in Illinois at 190,000. Instead of being a wild guess without foundation, sufficient data shown herewith proves that the estimate is most conservative. Less than two hundred reports show an installation of 92,851 instruments. and, moreover, it will be noted that few of the more important Illinois cities are represented in the accompanying list. Springfield, Peoria, Aurora, Elgin, Quincy, Ottawa and other important cities are conspicuous because of their absence, and for no better reason than that lack of time has prevented the proper office attaché from making the required report. Presuming, however, that only one-third of the exchanges of Illinois are represented by the figures here shown, the total installation would be increased beyond the quarter of a million mark with a healthy surplus. It can be safely conceded that Independents them-

selves know just how great has been the development. The record of Illinois, as previously set out is 1,000 Independent exchanges and sub-exchanges. One-fifth of these show an installation of nearly 100,000 telephones, and it is considered undoubtedly conservative to place the total installation anywhere less than half a million.

In the 1900 census, Illinois is credited with having more than a million families. Only a little less than half this number own their own homes, the rest being tenants. The telephone is no respecter of financial conditions. It is obviously a household necessity, and it is not unreasonable to believe that with a state population of more than five million inhabitants that the proportion of telephones in use is over-estimated.

In the matter of gross value of all manufactured products, statistics give Illinois third place. In the manufacture of Independent telephone apparatus the state stands easily first, and it is with considerable pleasure that a number of views of the manufacturing establishments and telephone supply houses are shown herewith. The Independent telephone manufacturer has passed all of the experimental stages in his career. His apparatus has withstood every test that years of actual service bring. The supply houses and manufacturers of auxiliary devices have shared in the increased revenues that have been coincident with the great growth of the telephone business. The affairs of the entire industry are in splendid condition and the experiences that were encountered in the early development of the movement—the bitter litigation into which the Bell monopoly dragged the pioneers—have equipped the management of the several institutions with a keen foresight that is seldom encountered in any other line of business.

A MULTIPLE TEST BOX

A Description of How This Apparatus May Be Built Inexpensively.

By Chas H. Coar

DURING the installation of multiple cables and jacks it often proves very desirable to have some simple test which will be of assistance in testing out the various taps to the jacks, by the insertion of a plug into these jacks. This is the most applicable method, and affords

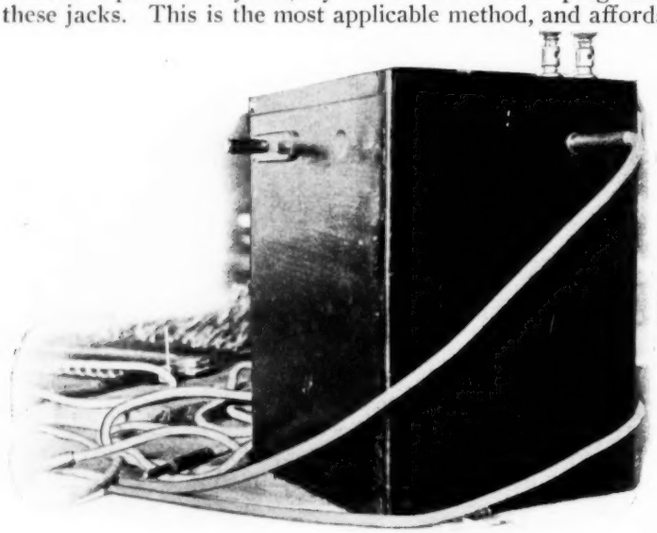


Figure 1.

a very clear and accurate test as to continuity, crosses or short circuits and reversals, such as are liable to appear in a set of multiple jacks when the number involved is very great. A test of this kind should be portable in form, and should be so arranged that it will be sufficiently flexible in its workings to meet the different requirements under the various conditions contended with in ordinary practice. The set described herein is of very simple design, is portable, by simply changing the length of one of the test cords by means of a piece of twisted pair wire, can be arranged to test over any number of multiple connections. The circuit shown in Figure 2 is involved and consists merely of a double throw key, a buzzer, four cells of dry battery, all associated together in such manner with regard to the two cords and plugs shown that the various tests can be made.

This equipment is mounted in a box of the dimensions shown in Figure 3, and this box may be constructed of any well-seasoned lumber dressed to one-half inch thickness. Care should be taken to fasten the box together in a rigid manner, and for this reason screws should be used in preference to nails. This is also made necessary partially because the dry cells naturally will have to be renewed every so often, in which case a few screws could be readily taken out to accomplish this result.

A view of the complete equipment is shown in Figure 1, where it will be seen that one of the cords is equipped with a plug adapted to fit a jack located in the test box. The remaining plug is arranged to be attached to the circuit by means of the two binding posts shown on the box. The cord is arranged in this manner so that it may be lengthened as the occasion requires. The key lever is also seen at one side of the containing case, and on close observance the outline of a hole is discernible adjacent to this lever, several such holes being bored in the box so as to provide

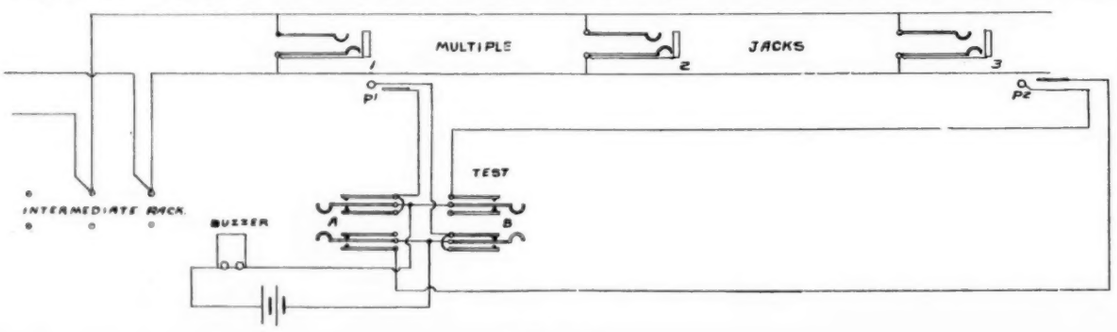


Figure 2.

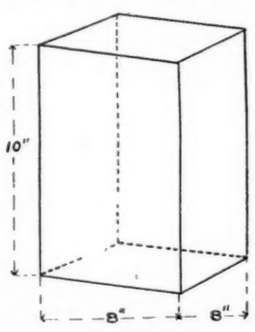


Figure 3.

an outlet for the buzzer noise when the same is in operation. Presuming now that the row of multiple jacks, shown in Figure 2, is installed or connected up on the bench, and that the same were to be tested by this arrangement, it would be accomplished as follows: One man would take the test box and locate at the first multiple where he would plug one of the cords, say *P1* into jack *1*, this plug being the one terminating in the jack of the test box. The other cord would be suitably lengthened by means of a twisted pair of wires to allow one to carry it sufficiently far enough from the test box to plug it into all the multiple jacks to be tested. Upon plugging *P1* into jack *1* should the tip and sleeve of the line be crossed at any point, the buzzer would operate immediately because a circuit would be provided for it to do so over, as may be readily traced. Assuming that this did not occur, one tester would take the portable plug *P2*, and insert it in the same line jack of the multiple adjacent which we term number 2. Plugging into this, the key in the test box would be operated so as to throw the *B* side out of normal position which would then test the conductivity of the tip conductor of this multiple jack between the two points.

Altering the action by operating the *A* side of the key, tests the sleeve conductor in a similar manner between the two points. It may be well to describe the circuit formed in this test briefly, so we will assume that the plugs *P1* and *P2* are inserted in the multiple jacks *1* and *3* respectively. A test of the sleeve conductor is desired so the *A* side of the key is operated, allowing positive current to flow from the dry cells up to and out the outer key contact of the *A* side, thence through the sleeve conductor of the plug and jack *1*, over the multiple circuit to the sleeve of jack *3*, presuming that the circuit is proper, thence over the sleeve conductor of cord *P2*, to the lower outer contacts of key *A*, and via this to the negative battery, thus closing the circuit and operating the buzzer. Thus it will be seen that, with both plugs inserted, a buzzer operation indicates a fair test. Should the buzzer operate when the plug *P1* is in alone, it would indicate that a short circuit existed between the tip and sleeve conductors of the circuit tested. From this brief description it will be evident that the amount of apparatus needed is very small and that the cost of assembling the same would be very low. The practicability of a test of this kind has been demonstrated time after time, and on this basis it can be recommended to those who may be in a position to utilize a test of this description.

A FEW RULES FOR TELEPHONE USERS.

The telephone is a utility that may easily be, and often is, abused. Some people delight to "cut in" on a party line and retail the conversations they hear as gossip for the neighborhood, says the Telephonic Age. Others use it as a sort of toy, or make it a nuisance by perpetually calling up people for the fun of the thing, making others wait who want to speak on important business. Here are a few rules, the observance of which would facilitate the work of central and preserve the telephone as a wonderful help to business men:

1. Don't call a man to the telephone for a sociable chat during business hours.

2. Don't waste the time of other people by talking longer than is necessary.

3. Don't jolly central and keep others waiting. Give central your number only. Anything more is an imposition on the other subscribers.

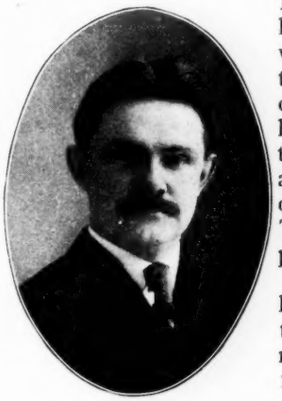
4. Don't use the office telephone to carry on personal conversations.

5. Don't relate gossip over the wire. If you must tell it, write it.

6. Don't use the telephone at all unless you have something to say.

REGARDING SWITCHBOARD EQUIPMENT.

In this issue will be found the first of a series of articles on "Modern Toll Switchboard Equipment," written by Messrs. John E. Hilbish, J. Bernhard Thiess and Guy A. Joy, which will be instructive and helpful to those engaged in construction of exchanges. All of these gentlemen have had practical experience in telephone construction work and are exceptionally well equipped to discuss the subject dealt with. TELEPHONY hopes the series will prove useful to its readers.

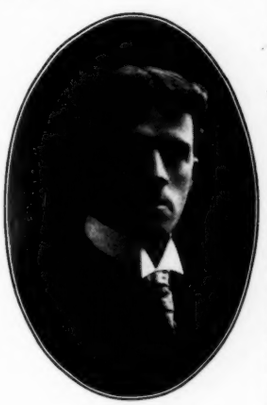


J. E. Hilbish.

John E. Hilbish, who is a well-known engineer, is a graduate of the electrical engineering department of Purdue University, class of 1898, finished a post-graduate course at the same institution the following year, and entered the telephone switchboard department of the Western Electric Company in 1900. The following year he gained experience in the telephone switchboard and installing department of the Kellogg Switchboard and Supply Company, and later was transferred to the engineering department, where he designed some of the largest common battery and toll switchboard equipments manufactured by that concern.

J. B. Thiess.

J. Bernhard Thiess was graduated from the Chicago English High School seven years ago, and after several years' experience with the Kellogg Switchboard and Supply Company and the installation department of the Chicago Telephone Company, took a course in telephone engineering at Purdue University. At present he is connected with the engineering department of the Kellogg company. He will present an article on the equipment of modern toll switchboards in an early number.



G. A. Joy.

Guy. A. Joy was graduated from the Nebraska State Normal School in 1897, where he also took a course in electrical engineering, finishing in 1900. He entered the shops of the Western Electric Company shortly after, and obtained practical experience in various telephone switchboard departments. In the fall of 1900 he entered the installing department of the Western Electric. Mr. Joy also has had practical experience in long-distance exchanges, working both in Chicago and Dayton, O. In 1901-02 he worked in the shop output department to become familiar with the details of the manufacturing end of the business. In the latter part of 1902 he became assistant chief installer for the Kellogg Switchboard and Supply Company, which position he held until 1904, when he entered the engineering department, where he is now employed.

MODERN TOLL SWITCHBOARD EQUIPMENT

The First of a Series of Articles Dealing with this Important Subject

By J. E. Hilbish, J. B. Thiess and G. A. Joy

ARTICLE I.

WITHIN the last few years the toll service handled by the Independent telephone companies has assumed such proportions that a careful study of the conditions that are conducive to good service seems very essential, and it is our purpose in the following to give a complete description of what is demanded in this direction by the various conditions that are met with in different localities.

In the handling of toll business one readily appreciates that the apparatus located in one exchange must operate with that found in the neighboring exchanges. The failure of perfect co-operation is the cause of some complicated conditions which have arisen due to the fact that the engineers of each telephone company have ideas of their own as to how they can best solve these problems, and consequently a great variety of schemes has been devised. Uniformity in this phase of the business is most important and the engineers throughout the Independent field are slowly but surely beginning to realize this very essential factor.

In approaching the problem of toll service it is but natural that we start with the small exchange in which one position of the local board is given up to the handling of toll calls, therefore we will first study the conditions that warrant the installation of this kind of equipment, and then gradually advance into the more complicated multiple toll board. In a small exchange having from five to ten toll lines, which are not very busy, the installation of a separate toll board is superfluous. It is to meet these conditions that we recommend that the first position of the local board be equipped as a toll position, and in case it is found that these lines are not in service enough to keep the operator busy, the rural lines in the exchange can be turned over to this operator, since the method of handling rural calls is very similar to that used in the manipulation of toll calls. As to how this position can be best equipped depends in a large measure upon the type of local board, as to whether the same be multiple or non-multiple, magneto or common battery. The various types of equipment necessary can be best explained by a complete and distinctly separate description of each kind of board.

The Magneto Non-Multiple Board.—This type of board very seldom reaches an equipment of more than six hundred lines and, since the revenue from a board of this size is not large enough to warrant the engaging of an expert, the toll equipment should be designed simple enough so that a man of little experience will have no difficulty in keeping the same in working condition. This requirement is nicely fulfilled by the arrangement shown in Figure 1. The operation of this circuit can most readily be explained by carrying a call through a complete cycle.

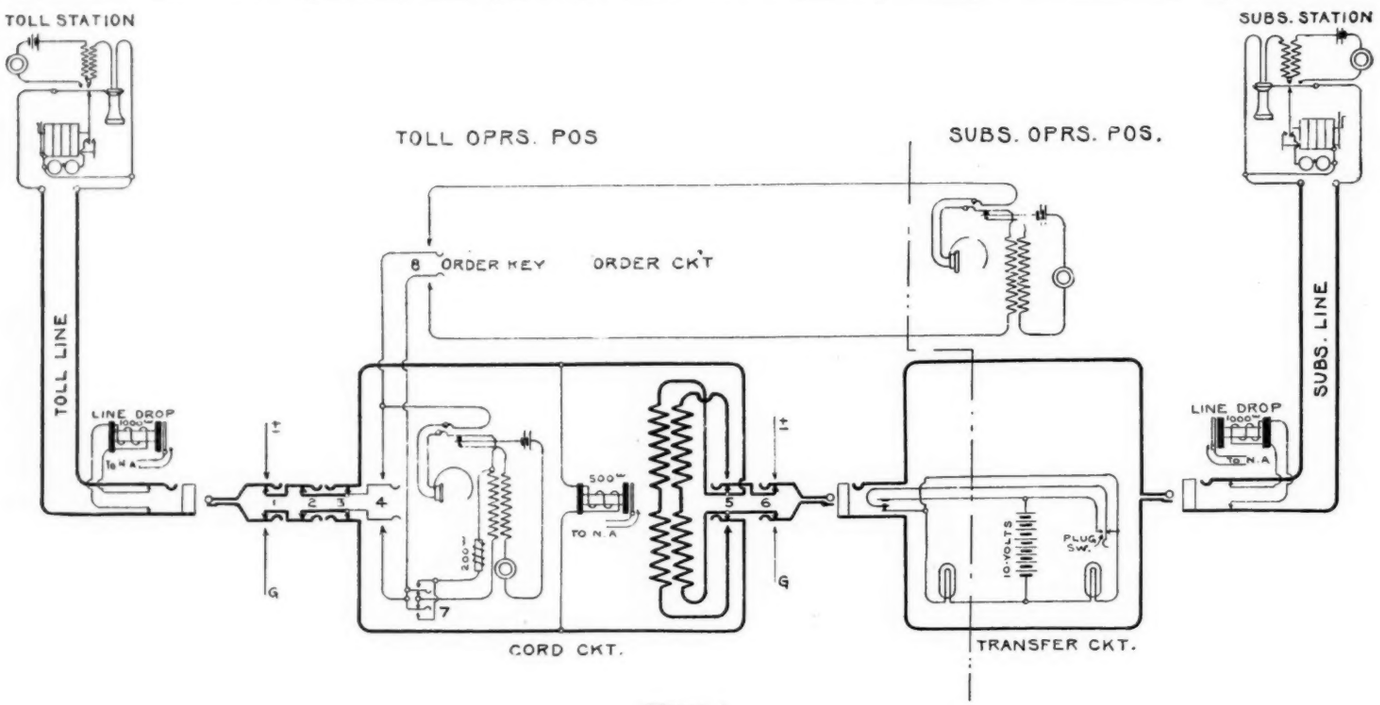


Figure 1.

When a toll subscriber desires to call central he will operate his generator thereby throwing the high wound drop bridged across his line by means of the series contact in the jack. The operator will then insert the answering plug of a pair of cords into the jack which operation will disconnect the drop from the line. She will then operate her listening key (4) and ascertain the number desired. If the jack of the subscriber wanted terminates in the toll or its adjacent position, the toll operator will simply insert her calling plug and ring. If upon connecting the two lines she finds that they are noisy she can by operating her repeating coil key (5) connect the two lines magnetically and thus reduce to a minimum any disturbances existing due to unbalance. These disturbances are causd by connecting a toll line with a local grounded line. The use of the repeat-

ing coil is not necessary where two metallic lines are connected. If, however, the subscriber desired is in a distant position the use of a transfer circuit becomes apparent. It will be noticed in the transfer circuit shown, that the toll end terminates in a jack and is plug ended at the local position. The reason for this will become apparent as we proceed. When the toll operator finds that she cannot

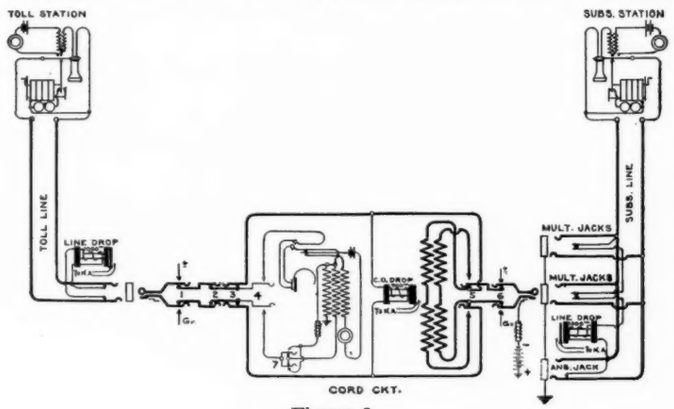


Figure 2.

reach the jack of the subscriber desired, she will plug into a transfer terminating in the position in which that jack is located. This operation will light the lamp associated with the plug end of that transfer. She will then press an order key, the circuit of which terminates in said position, and instruct the local operator as to what number is desired, she, upon receiving these instructions will pick up her transfer plug and insert it into the jack of the desired line. The raising of the plug will operate the plug switch and this will extinguish the transfer lamp. The toll operator will then ring the party and the connection is completed. When the subscribers have finished they "ring off," thereby throwing the clearingout drop which is permanently bridged across the cord circuit. The toll operator will then operate her listening key to determine whether the conversation has been completed, or whether the subscribers wish further service. In case both subscribers wish to talk to her she can by means of her double cut-off key (2 and 3), talk to each subscriber separately, and thus avoid the confusion of having three parties on the line. If, however, she finds that the subscribers have finished she will take down the connection. This will light the lamp associated with the transfer circuit at the local position thus giving the operator a disconnect and she will then remove her connection, thus restoring the apparatus to its normal condition.

If a toll call originates at the local position the operator will simply take down her local plug and insert the plug of one of her transfer circuits into the jack of the line of the party desiring a toll connection. This will operate the plug switch thereby lighting the lamp associated with the transfer at the toll as well as the local position, and hence the toll operator will plug into the jack of said transfer thus extinguishing the lamps and she will handle the call in the regular manner.

We are now in a position to comment upon the advisability of a plug ended transfer. As will be observed from the above, the toll operator has absolute control of the connection, whereas if a jack ended transfer be used it would mean the use of another cord circuit in putting up the connection at the local position. This would mean that another clearing out drop would be bridged across the line which would not only cut down transmission but might also result in a confusion of signals. Furthermore, the local operator would have an opportunity to listen in by means of her listening key and this is no trivial matter in a small exchange, where traffic is often very light and the operators are at a loss as to how to kill time; and last but not least, by the method outlined the elimination of one cord becomes possible.

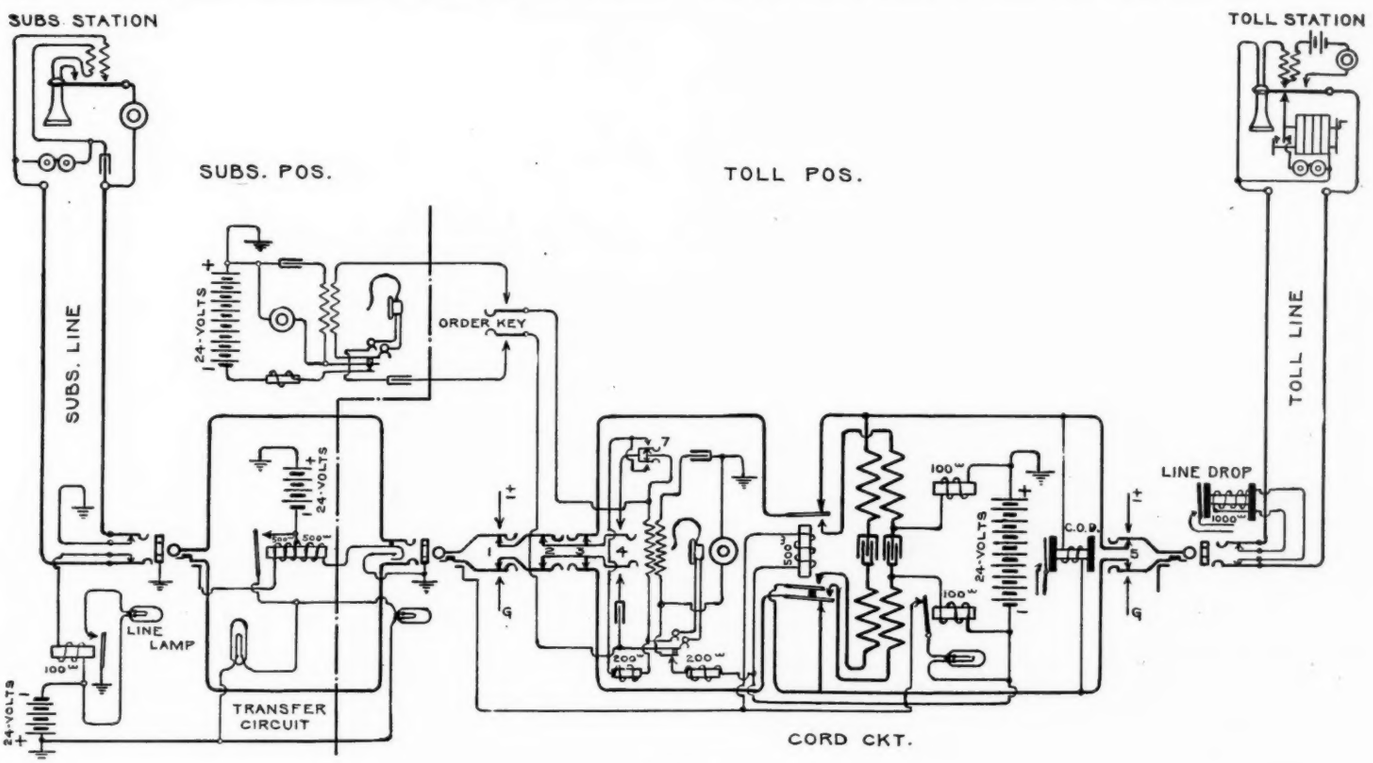


Figure 3.

At first glance it might seem that the use of a repeating coil in each cord circuit is superfluous, but when we stop to consider that this equipment obviates the changing of cords due to special conditions, and thereby greatly increases the operating efficiency at an additional initial ex-

penditure of about $3 to $4 per circuit, we begin to realize that this capital is well invested, since it will improve service, and this in the long run will increase business.

In addition to what has been previously said as to the advisability of the double cut-off key it is very often quite necessary that she be able to talk to each party separately. When an operator has a subscriber waiting on a line for a toll connection she certainly ought to be able to cut off that portion of the line, while she is making arrangements for the other end of the connection. By this means she will avoid all unnecessary annoyances due to the waiting subscriber breaking in and consequently can complete her connection with much more rapidity. Since speed of operation is an important factor we consider that additional expenses to augment such facilities are well invested.

Magneto Multiple.—The most logical advance from the non-multiple magneto board is the step that takes us to the magneto multiple board. Since we may now place the multiple jacks of all the local lines directly in front of the toll operator, the method of handling toll calls with this kind of local equipment is simplified to the extent that no trunking equipment is necessary. The cord circuit previously explained (Figure 1) can be very readily adapted to this class of service, the only change necessary being the addition of a third conductor. This third conductor is the means by which battery is put on the sleeve of the jack for a busy test, *i. e.*, it is wired through a retardation of ten ohms to a battery of about ten dry cells. This arrangement of the equipment is shown in Figure 2. When an operator plugs into the multiple she will put the potential of the negative side of the previously mentioned battery on the sleeve of the jack and hence if the toll operator tests a busy line in the usual manner, she will complete a circuit through the sleeve conductor of her cord and the tertiary winding of the induction coil to ground, and will consequently obtain the regular busy signal. In case no test is obtained the connection will be put up in a like manner to that previously explained for the non-multiple switchboard, where no trunking is necessary.

The Non-Multiple Common Battery Board.—In connecting a toll line to a common battery line it is imperative that the same be connected through a repeating coil, so as to keep the battery feeding the local line, from flowing out on the toll line. For this reason, in this class of service we must either arrange our cord circuit so that it is universal, *i. e.* so that it is well adapted for toll to toll as toll to local connections, or we must install two kinds of cords. Wherever it is possible it is advisable to make the cords universal, for we all know that an operator is not infallible, and she is very likely in a busy moment, if two sets of circuits be installed, to use the wrong pair of cords, thus causing confusion and giving poor service. Furthermore, if the operator does not have to bother about the kind of lines she is connecting, thus making her work more or less automatic, she can work much more efficiently.

A very ingenious method of accomplishing the above is depicted in the circuit shown in Figure 3. The toll end of this circuit is an exact duplicate of that shown in Figure 1, but the local end of the cord varies, in that it has a three in place of a two conductor cord, and the repeating coil

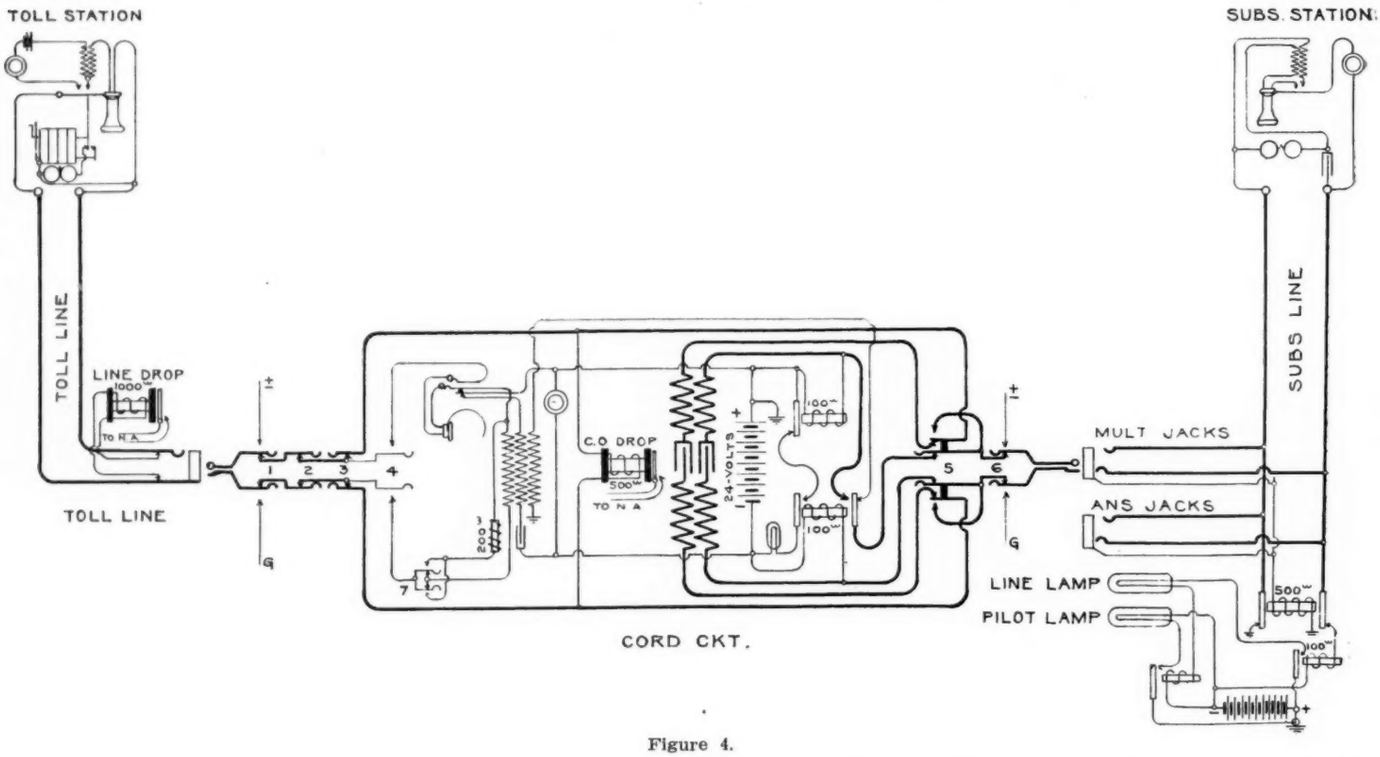


Figure 4.

key is omitted since its functions are performed automatically by means of the sleeve relay.

The cost per cord circuit for such equipment is a little more than for the other type of equipment; but due to the fact that not as many circuits will be required, the equipment for the entire position is but a very little more expensive. The design of this circuit is such that in its normal condition it is arranged for toll to toll connections, hence the sleeve conductor of the toll line jacks are dead ended, and therefore the condition of the circuit remains normal when the plug is inserted into a toll line jack. The use of a repeating coil is not necessary in a toll to toll connection since it is universal practice to make all toll lines metallic, and therefore disturbances due to grounds will be absolutely eliminated if the pole line construction is what it should be.

If the plug be inserted into the jack of a local line, however, the sleeve of which is wired to ground, we will see, by referring to Figure 3, that this will complete a circuit through the sleeve of the cord and the sleeve relay to battery, thus energizing the relay, thereby placing the repeating coil in circuit, and at the same time feeding battery

to the local subscriber. Consequently for this sort of a connection the toll operator's work will be reduced to simply inserting the plug and ringing.

If the subscriber's positions at the board number three or more, however, it will become necessary to transfer all calls, excepting those desiring numbers that terminate in the jacks at the toll or its adjacent position. A transfer well suited for this purpose is shown in Figure 3; and the method of operation is as follows: Should the toll operator desire to connect a party on a toll line with a subscriber whose line terminates in a distant position, she will plug into one of the transfer circuits, the plug end of which is located in the position at which the line desired terminates. This act will operate the relay in the transfer circuit, thus lighting the lamps associated with said transfer at the toll as well as the local end. At the same time she will, by means of her order circuit, instruct the local operator as to the number of the subscriber desired. Thereupon, the local operator will insert the plug of the transfer associated with the lighted lamp into the required jack, thus energizing the differential winding on the transfer relay, which will cause the armature to fall back and the lamps at both ends of the transfer circuit will be extinguished. The toll operator will then ring the local party and the connection will be completed. When the conversation is finished, the toll subscriber will "ring down" the clearing out drop in the cord circuit, while the local subscriber upon hanging up will light the supervisory lamp in said circuit. The toll operator will then remove her connections, thus lighting the transfer lamps and giving the local operator a disconnect and she will also take down her connections and thus restore the apparatus to its normal condition. It will be observed that in this system, as well as in those previously described, the toll operator will have the entire supervision of the toll connection, and said condition is important for good and speedy service. If a toll connection originates at a local position the local operator will simply take down her local cord and plug up the call with one of her transfer plugs thus lighting the lamp at the toll board associated with this transfer, then the toll operator will take up the connection and complete it in the usual manner.

Common Battery Multiple Switchboard.—When a position at a common battery multiple board is equipped as a toll position the conditions are somewhat different than for a non-multiple board, since it becomes necessary to test the multiple jacks to ascertain whether or not the desired line is busy. A circuit arranged to meet these requirements is shown in Figure 4, and said circuit shows conclusively that as the exchange grows and the local equipment is improved, the local end of the toll cord becomes more complicated. The toll end of the cord is similar to that shown in Figure 3, whereas the local end is radically different, since we again resort to a two-conductor cord and a repeating coil key. The circuit in its normal condition is arranged for toll to local connections—the repeating coil is in circuit, but the same can be cut out of circuit by operating the cam of key (5) which operation also disconnects the battery from the tip and ring conductors of the cord circuit.

The operation of the circuit is as follows: When a toll subscriber desires a local connection the toll operator will test the multiple jack of the line desired in the usual manner. If the line is not busy the ground potential of the battery exists on the sleeve of the jack. Hence if the operator touches the same with the tip of her plug no flow of battery will result, since the tip of the plug is at the same potential, by virtue of the ground attached to the tertiary winding of the induction coil which is in direct connection with tip of the cord through the back contact of the ring relay. If the line be in use, however, the potential of the sleeve of the jack will have been raised by the ring of the plug inserted, to that of the negative side of battery, and consequently if the toll operator makes a test on such a line, she will obtain a flow of battery through the tertiary winding of the induction coil and as a result, will obtain the usual busy signal. If she finds that the line is not busy she will simply insert her plug and ring. The insertion of the plug will light her supervisory signal through the make contact of the ring relay, but said lamp will be extinguished as soon as the local party answers, as this will energize the tip relay, thus breaking the back contact on said relay which will open the lamp circuit.

When the conversation is finished the toll subscriber will ring down the clearing out drop and the local subscriber will hang up his receiver, thereby robbing the tip relay of its battery which will cause the armature to fall back and thus light the supervisory lamp. The toll operator will then take down her connections and restore the apparatus to its normal state. In case a toll call originates at a local position, the local operator, by means of her order circuit will inform the toll operator as to the number of the party desiring the toll connection. Then the toll operator will answer said party in the multitude and the local operator will take down her connection. The toll operator will then handle the call in the regular manner. If a toll to toll connection is desired the toll operator will merely operate the cam of her repeating coil key (5), plug up the connection and ring.

Thus far nothing whatever has been said about the operator's telephone circuit. In all our circuits we have shown a secondary cut-out key (7). It is very important that each operator's telephone circuit be equipped with one of these keys, since by means of this key the operator is able to listen in on the connection without interfering with the conversation. By operating this key the secondary of the induction coil is opened and a retardation coil is inserted in series with the receiver, so that any noises picked up by the transmitter will not be transferred to the line.

THOUGHT IT TIME TO STOP.

C. J. H. Woodbury of Boston, the well-known telephone engineer, recently told the true version of the Sitting Bull telephone story. Sitting Bull had been captured by the United States troops and was held in close confinement. So also was another obstreperous Indian, held in confinement at a post about 100 miles away. The officer in charge of Sitting Bull had been chasing the Indians for two months, and was wondering what he would do with the captive. In an inspired moment he decided to arrange an interview between the two Indians over the telephone. After the necessary ringing up Sitting Bull was asked if he cared to talk into the machine. He talked into it for several minutes and did a heap of listening also.

He put down the instrument finally, and for hours was even more gloomy than usual, at last beginning to talk to himself, something very rare for the Indian. Asked if he was dissatisfied with his accommodations or if there was anything they could do for him he broke forth at last:

"No. I'm finished. It's all right when the white man's plaything talks the white man's language; but when it learns to talk the red man's tongue it's time to stop."

It is believed in the west, where the incident is fairly well known, that this talk over the telephone between the two Indians had a considerable influence in shortening the Indian wars.

Is the telephone destined to modify the American voice? Mr. William H. Kenney, head of the voice department of the Emerson College of Oratory at Hopkinsville, Ky., believes that it is. He says that the necessity of clear, precise enunciation which the telephone imposes upon those who use it is likely, in the course of the next generation or two, considerably to alter the character of American speaking.

QUESTIONS AND ANSWERS

By J. C. Kelsey

For your information, I wish to state that I have found the G. W. K. phantom circuit scheme successful. For the benefit of those who have been experimenting with the circuit, I would suggest that you print this testimony in the columns of TELEPHONY. It occurs to me that some of those who are not meeting with success probably do not use sufficient care with their lines. It requires only a little thing to throw a line out of balance.—E. C. R., Ind.

It hardly seems necessary for me to confirm that it is easy to throw a line out of balance when experimenting with the G W. K. phantom circuit, because lamp filaments are not alike in resistance. G. W. K. has written to me only recently, that he is having great success with his bridged lamp phantom; and in his letter he suggests that carelessness must be responsible for the failures of others. I am sure that if a balance can be found, the idea is correct. The scheme reveals that the reader and operator are on a still hunt for a cheap duplexer. In my opinion the lamp idea is as good as any other non-conductive bridge scheme, provided always, that balance in the line is easily found.

Please advise us with reference to the advantages or disadvantages of common return. Is common return as good as the metallic circuit for telephone exchanges? Can you furnish any information which shows the durability of cypress and white cedar poles in order that we can make comparisons?—G. F. C., I. T.

The common return has many disadvantages and it is not as good as a metallic system, because metallic is free from induction except from cross-talk, and can be directly connected to the longest and most sensitive toll line without danger of encountering trouble. The only advantage a common return has, is apparent in a grounded system, inasmuch as common return will eliminate earth currents if you are in the vicinity of a trolley line A common return cannot be freed from cross-talk; and it does not matter whether you use iron or No. 1 copper wire. If you have ever tried to short circuit a receiver with any resistance above a fraction of an ohm, you have been able to entirely silence it. The theory for common return is to entirely short circuit all other lines. This, of course, is practically impossible. We regret our inability to give you any satisfactory information concerning the durability of poles.

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(1) Why is it that 1,000 and 500-ohm ringers are standard for individual lines for common battery, and 80-ohm ringers for individual magneto work? If there is any good reason for the former, it looks as though the manufacturers would find a ready sale for 500-ohm bridging telephones with 3 or 4-bar generators for individual and 2-party bridging lines at an additional cost of not more than fifty cents over a good series telephone. As it is now, there is two or three dollars difference between the cheapest bridging telephone and the best series telephone, although each is made by the same firm. (2) Why is it necessary to have a separate polarizing magnet or ringers? Why not make the cores larger and of steel permanently magnetized? (3) In common battery systems in which battery flows through the receiver, could not the permanent magnets be left off—the battery current being sufficient to keep it magnetized? This would save mistakes in "poleing" the receiver. (4) Certain of the Independent telephone transmitters look so much like the Bell transmitters, both inside and out, that I would like to know what patented and distinctive feature the Bell transmitter has that is not used by the Independents. (5) Has the Western Electric Company ever manufactured a receiver with a concealed cord terminal? Has it ever manufactured a long arm transmitter with a concealed cord? Does it make a "compact style" magneto telephone or one with anything larger than a 3-bar generator? It might be interesting for you to know that I have given considerable thought to the sticking ringer discussion which has been appearing in your department. I believe that the ringers stick because of the pole changer being out of adjustment so that it supplies stronger current in one direction than in the other. A method for proving this would be to reverse the battery leads to the pole changer and note whether it would not temporarily clear the trouble.—R. H. J., New Mexico.

(1) 1,000- and 500-ohm ringers are not necessarily standard for common battery work, although either are satisfactory. The 80-ohm ringer for magnetic work is a relic of early days when a subscriber was obliged to accept any kind of service, and there were no induction troubles. It is a well-known fact that there are more series telephones than bridging in use to-day, and it is evidently due to an absurd difference of price. The manufacturer should not receive all of the blame, for conditions have been largely responsible. The idea of a 500-ohm bridging bell seems to be all right, but when more than two parties are on the same line, trouble is very apt to be encountered. I am inclined to think you have your estimate a little high when you say you are required to pay three dollars more for the cheapest bridging generator than for a good series generator. I believe you will find by careful investigation that a 3-bar bridging, 500-ohm ringing telephone can be bought within fifty cents of a series telephone. (2) A separate polarizing magnet is necessary. If the cores were made larger and of permanently magnetized steel, it is quite probable that the ringers would not respond to the changes of the alternating current. You are probably aware that electro-magnets are made of the softest steel or iron, in order to insure the use of the greatest number of lines in force. The ringer is simply an electro-magnet acting on a permanent magnet; thus affording the cable attraction and repulsion. (3) In common battery telephones, the receiver is usually removed from the direct current which prevents wrong polarization. You would probably discover if you did not use permanent magnets, an absence of character in the transmitting of tones. (4) The White solid-back transmitter has been very closely imitated by a number of Independent manufacturers, some of whom have reproduced it piece by piece. It has no distinctive feature and cannot even be said to be above the ordinary in the way of its performance. Some of the Independent manufacturers have had trouble in the past with their transmitters, but trouble frequently happens in the best of regulated concerns. (5) The Bell has a receiver with concealed binding posts, but it is a ridiculous looking device. I do not believe the Bell has ever tried to conceal the cord, and I have never seen a compact telephone of the Bell brand; nor do I recall ever having seen a 4-bar magneto generator made by the Western Electric Company.

Will you please give some simple device for testing aerial cable without a Wheatstone bridge and other special testing instruments? —G. M. S., Ohio.

I believe the best device for testing aerial cable is a good reliable carriage that will enable you to ride the cable without danger to your neck. In testing for short circuits you can accomplish good results with a battery and receiver, comparing effects of a good pair of short circuits at extreme end with a faulty pair. By doing this you may be able to form a working comparison. The same apparatus will also answer to locate "opens." You will receive a click due to capacity of a good pair, which should be compared to the click of the faulty pair and to an entire short circuit. Between the three clicks you can obtain a fair proportion. Grounding due to a wet spot can be located by the cable rider, but the process is slow and tedious. Your company should invest in a Wheatstone bridge if it has much or little

cable, because the instrument will save it money. A trouble hunter is always handicapped without practical aids, and without a bridge you are like a lawyer without a library, a physician without medicine and a Chicago policeman without a billy.

What is a "charged" toll line? How is a line so "charged"? Can a toll line be "charged" so it will work with a local battery magneto system, and if so, how?—F. I. V., Oregon.

The chaff from wheat blown across a line, or snow driven by a storm, sometimes will gather on a line, and in the western country dust driven before a storm will accumulate on lines to the extent that will cause crackling and sticking in jacks and drops. The fault may be corrected by bridged coils grounded at some central point. Any of the causes above enumerated will "charge" a line. A toll line requires no charging of any kind to work with local battery or magneto system. It is very evident that you have become confused. We sometimes hear of charging storage batteries over toll lines and still use the line for talking, but I always feel like saying under such circumstances, "Lord help the toll line." Whether your toll line is composed of only one or more wires, you have only to connect the magneto telephone. Sometimes a toll line is charged with statiic electricity when paralleling a high tension electrical circuit with a grounded leg. Such a line is always dangerous to life and should never be used for toll purposes. My reply to your question may appear unsatisfactory, which might be explained because I have no knowledge of the condition which prompted your inquiry.

I would like to obtain some high frequency ringers that will ring ten instruments on a grounded line without interference. I do not want the ordinary bell, but would prefer a reed or buzzer. My idea would be to have each instrument supplied with one or more coils with soft iron cores and a fixed reed that would vibrate in response to its particular frequency. Please advise whether you know of such apparatus.—J. C. K., Ark.

I do not believe you will succeed with high frequency ringers on a grounded line that will make it possible to select ten different parties on a reed basis. Present practice is limited to four parties. No manufacturer can handle your proposition without entailing great expense to you, as your demands are not usual. It will require a great deal of time and money to develop your idea.

Why do various operating Bell companies attempt to run magazines? It was only recently that all of the sub-licensee companies were heartily opposed to any such policy.—W. B. S., Ohio.

The practice is as much of a mystery to me as it is to you. When I was with the company, we used to receive our pay in "titles." To illustrate, a superintendent of construction would ask for a salary raise from $75 to $85 a month—the Bell standard price. The management would invariably respond by saying: "Well done; thou good and faithful servant, thou hast been, etc., etc. We will make thee ruler over many things; we will increase your responsibility and keep you busy and in appreciation will make you general superintendent, but we cannot raise your salary. You really do not want us to do this, because we need the money for our own dear directors and stockholders." It is quite probable that the old gag of titles has worn out, and for a substitute, the company is now in the publishing business dealing out its "brag" for the benefit of some poor workmen, and by this cheap sop encourage him to hang on for a few more years. Besides, these publications like to belittle Independent securities; just why, I am not able to state, because every word they utter against Independent securities is a bang right on thir own head. We live in a mad country and our Bell friends sometimes act as if the good old summer time's sun had affected them. The Bell magazines may succeed in cheating Bell employes a few more years by dealing out hot air to them, but it reminds me of the story they used to tell to the slaves in Missouri. Kansas was always described as a lake of brimstone and fire, and the slaves believed it because they never ran away in that direction.

I would like to have more information concerning a certain diagram that was used in November TELEPHONY to illustrate the best method of measuring to an open in a toll line.—G. W. K., N. D.

The diagram to which you refer on page 276, November TELEPHONY, Figure 1, is meant to show an ordinary Wheatstone bridge arrangement consisting of fixed resistance *A* and adjustable resistance *R*. The telephone is placed across the terminals in such manner, that if the conditions were balanced, there would be no noises in the instrument. If the metallic line was opened at a distance *X* from the exchange, a certain amount of alternating current would flow through variable resistance *R*, and the capacity of the line due to the distance *X*. The good metallic line has certain capacities due to its length. It is greater than the distance *X*, which might be one-half or one-third of the complete distance which is called *L*. For example, if you had two copper lines from Hope to Casselton exactly alike and would put on a bridge and generator and found that it took twice as much resistance at *R* as you had at *A* to make the

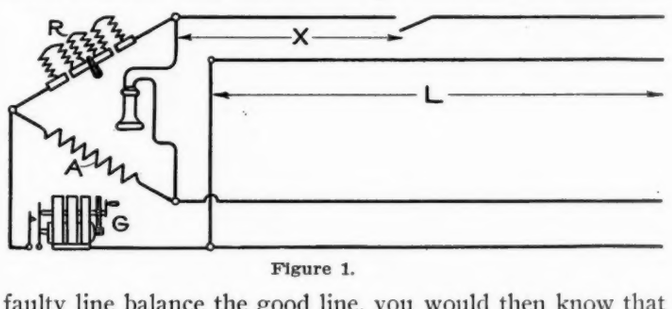


Figure 1.

faulty line balance the good line, you would then know that the line at fault had just half the capacity of the good line. With this information you would know at once where to look for the trouble. Suppose Page was half way, it would only be necessary to call Page over the good line to go out and find the trouble. In a practical way, open lines are usually found by ordinary local tests. The Page operator could call Casselton without being able to call you. You could call within one station of Page, hence ascertaining the trouble must be between the point called and Page. The test is particularly for cable work and is simply a comparison of capacities. If conditions are alike, as they practically are in cables, it is easy to keep adjusting *R* until the note in the receiver reaches a minimum or dead point. In this figure you will notice that good wires of both circuits are tied together. It is necessary to do this in order to obtain comparison capacity results.

I have three bridging instruments of standard make—the bell magnets being marked 1,600 ohms. I presume that this mark means that the bell has a resistance of 3,200 ohms, although I am not certain about it. One of these instruments is installed in Dawson, the second thirteen miles away, and the third, twenty-nine miles away. The line is new, full metallic. I want to use a line for these three instruments as well as for three telegraphic instruments, and will be glad to know what necessary apparatus or circuits should be employed by elimininating the ground. You may wonder why I cut out the ground; but when I explain that it is impossible to secure any ground here except in the Yukon river, you will probably understand. In winter, the earth is frozen as hard as iron for seven months; and during our short summer, it does not thaw more than three feet. My stations are all remote from the Yukon river and without the river bed, it is impossible to procure a ground.—A. J. N., Yukon Ter.

If your bridging ringers are 3,200 ohms, I am sure your manufacturer has exceeded all limitations. It had been my belief that 2,500 ohms was the maximum, and that 1,250 ohms was sufficient for any instrument. Your proposition to use a full metallic telephone circuit offers every diffi-

culty to produce perfect balance. The telegraphic impulses may be flattened out until they are hardly perceptible, which would not be satisfactory. Long distance telephone companies use each side of the line for telegraphic purposes, and I can foresee no reason why each side of your line cannot be used for a telegraphic circuit. The use of this standard telegraph-telephone circuit will prevent your bells from ringing and will require the adoption of howlers. It is my opinion that the howler will eventually supersede the magnets and ringer for certain purposes. You will understand that the circuit I have suggested will apply to only the two terminal stations. To use a middle telegraph instrument will require telegraph repeaters. I would much prefer to rely upon a circuit that is in actual operation and which shows three telegraphic instruments and three bridging telephones in use. Some reader of TELEPHONY ought to be able to supply this. Personally I do not know of any condition offering the same obstacle as set forth by you. The current required is so small that it is hard for me to believe that it could not be supplied by crowding on of battery or that a sufficient ground could not be obtained by some combination heating or driving process. However, ice is such a splendid insulator that I can readily understand that the real earth would have to be found.

I have been doing some work on single iron lines connecting with switchboards of different makes, and find in every case that each line is grounded at the board on a separate rod. I am told that it cannot be done any other way. I have put in two boards with a single ground and they are working well; but I would like some higher authority to tell me any reason, if a reason exists, why a single ground will not do the work.—J. A. K., Ark.

One ground is ample for all your lines if the rod is driven deep. It must always be below frost line and with a surface which would offer no resistance to the earth. You will always get cross-talk in any work on a grounded basis whether you adopt separate grounds or common ground.

Will you please explain what advantage the common return system has over the ordinarily grounded one? From my experience I find there is no difference between the two as regards cross-talk and earth disturbances. The insulation resistance in both is always very low. Is it advisable to keep the insulation resistance as high as possible? If a metallic line is made of No. 12 wire on one side and No. 10 on the other, will it produce an unbalanced condition? Could balance be affected by properly inserting non-inductive resistance?—C. S. S., Ill.

I have had a little something to say on this subject in reply to the second question in this article. The insulation resistance between a common return and ground is quite apt to be low. It does not matter ordinarily unless you have a trolley line to contend with. It is always well to keep resistance of the system high for toll line purposes, if you connect without repeating coils. A line made up of No. 12 and No. 10 wire is unbalanced from the start. Balance can be affected by an adjustment of non-inductive resistance as far as your phantom circuit is concerned.

SAGS AND STRESS IN OVERHEAD WIRES

An Article from the National Telephone Journal Giving Ideas of ***English*** *Practice.*

By T. Fletcher, M. I. E. E.

ONE of the most important and, at the same time, interesting duties devolving upon the constructor of aerial lines is the determination of the proper stress to which the wires shall be subjected during the process of erection, the object being to ensure that, while they shall not be unnecessarily slack at high summer temperatures, they shall not be so taut at low winter temperatures as to be unable to bear the augmented stress to which they are then liable to be exposed. In this connection it may be explained that, of course, only normal climatic conditions, such as are experienced in this country year in and year out, are considered, because there are certain abnormal conditions which sometimes arise, such as a high wind suddenly springing up when wires are heavily coated with frozen dew, and in which no wires, however well erected, can escape destruction.

It is a fortunate accident that most experienced wiremen have acquired the art of pulling up new wires in all ordinary conditions of weather to the proper tension, and anything like extensive failure is rare. In fact, the hand of the practiced wireman seems to *feel* the proper tension, and the eye of the experienced foreman recognizes pretty nearly the proper amount of sag. But it is just here that the personal element comes in, and while on the part of some men there is a tendency to leave the wires rather slack, there is a more general tendency on the part of others to pull wires up as taut in hot weather as in cold.

It is therefore highly desirable that reliable data should be available for the construction of tables showing the requisite stresses and resulting sags at different temperatures for wires erected in varying spans.

Tables of this kind have been prepared and published in the past for guidance in the erection of telegraph and telephone wires.

In 1874, in Calcutta, Mr. R. S. Brough, of the Indian Telegraph Department, published a small pocketbook of formulæ for the use of telegraph engineers. In this he pointed out that the length of itself which any wire can just support without breaking is constant for the same kind and quality of wire, of course irrespective of gauge. He also gave a table showing the relative dips for various spans of iron wire, though he omitted to give temperature. He further pointed out that the dip for any span is the same for all gauges of any of the same kind and quality of wire, and that it varies approximately as the square of the length of the span.

In 1882, Mr. Treuenfeld published in the London Electrician a very interesting article dealing with this subject. In this he gave a table of dips for different spans at varying temperatures. Tables have also been given in the handbooks of Culley, Preece and Silverwight, etc.

In most such tables, a factor of safety of four has been adopted; *i. e.*, they have been calculated on the assumption that at the lowest normal winter temperature, the wire is not to be subjected to a stress exceeding one-fourth of its breaking weight. In the tables recently issued by the postoffice, a factor of four is taken for iron and copper, and a factor of three for bronze. But, although it may seem terribly bold and unorthodox to breathe the suggestion, it may be doubted if these conditions are adhered to in practice. Indeed, the "regulation" of postoffice wires seems to indicate that a lower factor of safety is adopted in practice, and that if the tables were rigidly adhered to the wires would be appreciably slacker than they are.

One of the most important features in the behavior of aerial wires is that due to elasticity, in virtue of which wires elongate more or less when subjected to stress, and tend to recover their original length when the stress is re-

laxed. This elastic effect was usually ignored in tables formerly issued, but it is apparently this which, in practice, saves wires from destruction by changes of temperature.

The formulæ usually employed in the preparation of the tables are as follows:

Let l = length of span, in feet;
d = sag at minimum temperature, in feet;
d_1 = sag at any higher temperature, in feet;
s = tension at minimum temperature, in pounds;
s_1 = tension at higher temperature, in pounds;
w = weight per foot of wire, in pounds;
L = length of wire in span, in feet;
T = difference of temperature, in degrees F.;
K = co-efficient of linear expansion, per degree F.

$$\text{Then } d = \frac{l^2 w}{8s} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

$$s_1 = \frac{s\,d}{d_1} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

$$d_1 = \sqrt{d^2 + l^2\,(\mathrm{T} \times \tfrac{3}{8}\mathrm{K})} \quad \ldots\ldots\ldots\ldots (3)$$

From (1), if any tension be assumed, the corresponding sag is obtained.

From (2), knowing the tension and sag at any temperature, by assuming any other sag the corresponding tension can be calculated.

From (3), given the sag at one temperature, the sag at any other temperature can be obtained.

It will be noticed that (3) contains the factor K, depending on the temperature, but that there is no factor involving the elasticity of the wire.

It has always been found in practice that wires erected according to the tables were too slack for good regulation, and the experiments herein described had for their object the checking of the old tables and the drawing up of new ones, which, by taking elasticity into account, should be more accurate and give better results in practice.

It was with a view to putting the question to practical test that the engineer-in-chief sanctioned the erection of the experimental wires on which careful and continuous observations might be made. All these wires were erected under the personal supervision of Mr. J. Shea, with the aid of the thermometer and dynamometer.

Experimental wires were first erected at Bermondsey by Mr. Appleby, of the southern division of London; and a large number of tests were made thereon by Mr. Coote, the resulting sags being taken by a measuring rod from a fixed datum. These tests were supplemented by a series of investigations carried out at the head office by Mr. Gall, Mr. Coote and the writer.

Three sites in exposed positions were subsequently selected at (1) Wavertree, near Liverpool, (2) Meadswood, near Leeds, and (3) Corbar Hill, near Buxton.

At each of these places three poles were erected so as to give adjacent spans of 50 yards and 100 yards respectively, the poles being well stayed, and the cross-arms fixed in a horizontal straight line. The work at these places was carried out, and periodical observations made, by Mr. Rowe and Inspector Parker of Liverpool, Mr. Lalley and Inspector Birkby of Leeds, and Mr. Bowes of Oldham, respectively.

The outcome of the experiments so far made appears to point to the eventual adoption of a factor of safety of 2.5 at 10 degrees F. for both bronze and hard-drawn copper, and the two tables here appended in which elasticity is taken into account are based upon this assumption.

Two points may be mentioned regarding the following tables: (*a*) that the tension for either wire may be regarded as independent of the length of the span, (*b*) that in regulating one would not measure to tenths of an inch although shown in the sags, but pull up to the required tension.

TABLE 1.

100 lbs. H. D. Copper.—Mean Tensions and Corresponding Sags.

Temp. F.	Tension lbs.	50 yds. inches	60 yds. inches	70 yds. inches	80 yds. inches	90 yds. inches	100 yds. inches
10	135.0	4.7	6.8	9.3	12.1	15.4	18.9
15	131.5	4.9	7.0	9.5	12.4	15.8	19.4
20	128.0	5.0	7.2	9.8	12.8	16.2	19.9
25	124.5	5.1	7.4	10.1	13.1	16.6	20.5
30	121.0	5.3	7.6	10.4	13.5	17.1	21.1
35	117.5	5.4	7.8	10.7	13.9	17.6	21.7
40	114.0	5.6	8.1	11.0	14.3	18.2	22.4
45	111.0	5.8	8.3	11.3	14.7	18.7	23.0
50	107.5	5.9	8.5	11.6	15.2	19.3	23.7
55	104.0	6.1	8.8	12.0	15.7	19.9	24.5
60	100.5	6.3	9.1	12.4	16.3	20.6	25.4
65	97.5	6.6	9.4	12.8	16.8	21.2	26.2
70	94.5	6.8	9.7	13.3	17.3	21.9	27.1
75	91.0	7.0	10.1	13.8	18.0	22.8	28.1
80	88.0	7.3	10.5	14.3	18.6	23.7	29.1
85	84.5	7.6	10.9	14.8	19.3	24.5	30.3
90	81.5	7.9	11.3	15.4	20.1	25.4	31.4
95	78.5	8.2	11.7	16.0	20.8	26.4	32.6
100	76.0	8.4	12.1	16.5	21.5	27.3	33.7

TABLE 2.

40 lbs. Bronze.—Mean Tensions and Corresponding Sags.

Temp. F.	Tension lbs.	50 yds. inches	60 yds. inches	70 yds. inches	80 yds. inches	90 yds. inches	100 yds. inches
10	80.0	3.2	4.6	6.3	8.2	10.4	12.8
15	78.4	3.3	4.7	6.4	8.3	10.6	13.0
20	76.8	3.3	4.8	6.5	8.5	10.8	13.3
25	75.3	3.4	4.9	6.6	8.7	11.0	13.6
30	73.8	3.5	5.0	6.8	8.9	11.2	13.9
35	72.3	3.5	5.1	6.9	9.0	11.5	14.2
40	70.8	3.6	5.2	7.1	9.2	11.8	14.5
45	69.3	3.7	5.3	7.2	9.4	12.0	14.8
50	67.8	3.8	5.4	7.4	9.6	12.2	15.1
55	66.2	3.9	5.6	7.6	9.8	12.5	15.5
60	64.8	3.9	5.7	7.7	10.1	12.8	15.8
65	63.3	4.0	5.8	7.9	10.3	13.1	16.2
70	61.6	4.1	6.0	8.1	10.6	13.5	16.6
75	60.0	4.3	6.1	8.3	10.9	13.8	17.1
80	58.5	4.4	6.3	8.6	11.2	14.2	17.5
85	57.0	4.5	6.5	8.8	11.5	14.6	17.9
90	55.6	4.6	6.6	9.0	11.8	14.9	18.4
95	54.3	4.7	6.8	9.2	12.1	15.3	18.8
100	52.8	4.8	7.0	9.5	12.4	15.7	19.3

In concluding this article, I may mention that the experimental wires at Liverpool, Leeds and Buxton will be maintained and periodically observed during the coming winter, and I hope to give the definite conclusions next spring.

WHEN THE PATENT EXPIRED.

What is believed to have been the first newspaper announcement of the expiration of the Bell receiver patent was made by the Bellingham Bay Express, an afternoon paper published in Whatcom, Wash., says the Telephone World.

The morning of the day the patent expired, April 14, 1893, Mr. John F. DeTierre, editor and proprietor of the paper in question, happened to meet an electrical man at a refreshment counter.

"Say," said the electrical man, "do you want an item?"

"Sure; that is what I'm looking for."

"Well just look at the date on your telephone receiver."

"Well I'll be hanged," said the editor, taking down a telephone receiver. "That is an item sure enough; that patent seems to have expired to-day."

Then followed a long string of questions, on telephone history, patents, the effect on the industry and many other questions that only a shrewd newspaper man knows how to ask. Mr. DeTierre had frequently roasted the local Bell service and was eager for information and the information he received was treated editorially, at length, in the afternoon paper.

INDEPENDENT TELEPHONE DEVELOPMENT

A Paper read before the Electrical Section of the Franklin Institute, November 22, 1906

By James B. Hoge

CONSIDERED from the standpoint of practical utility and convenience, the telephone is the greatest invention of this progressive and inventive age. It may be justly claimed that its adoption marks an epoch in human progress, since its use has done more for all practical purposes to annihilate time and distance than any other method of communication or transportation. Few perhaps think of the telephone in connection with transportation, yet to-day it is doing very much to make travel in many instances unnecessary. Stop a moment and consider how much more crowded the streets of your city would be if it was not for the use of the telephone. "Don't travel—telephone," is a sound maxim that is being very generally observed.

I ask your pardon for digressing a few moments to call attention to what seems to be inherent human instinct, the desire for rapid means of communication. We see it manifasted even among savage people, and explorers tell us of a unique plan to use by the tribes of certain hill countries. A messenger is dispatched to the top of the nearest hill and shouts his message, using a code of whoops and yells, to the next messenger, who transmits it in like manner from the next hill top, and so on. By this means, we are told, the tribes could communicate very rapidly with each other. The American Indians at the time this country was discovered had a well-developed system of smoke signals, which enabled them to transmit intelligence regarding the movements of their enemies or any important matter in a very brief space of time. Numerous methods were employed by the early settlers for communication between centers of population; we find the slow going messenger wending his way over hill and dale, the lumbering stage coach, making its way over the old national pike, and other post roads, with a few passengers and heavy mail pouches, with relays of horses and drivers, covering at best from forty to sixty miles a day; the more rapid pony rider mail carrier, often averaging 100 miles a day. Then there was the wigwag system, seldom, if ever, used in civil life, but employed in military circles. Then the steam railway, a wonderful improvement over the stage coach, reaching at first, in a limited way, the principal centers of population over circuitous routes, with heavy grades and crude construction, but passing from improvement to improvement and developing into the wonderful railway system of to-day that makes possible our Twentieth Century Limiteds, traveling palaces, rushing across the country with their precious human freight, conveying the United States mail from this city to Chicago, a distance of 825 miles, in 16 hours.

Now, as a crowning achievement in methods of communication, we have the telephone, which, like all other electrical inventions, was made possible by the one whom you have seen fit to honor by naming your institute after, who with his kite discovered that wonderful, mysterious fluid we call electricity, leaving its great power, its varied applications, as a problem for future generations to utilize for their profit and pleasure. Truly the citizens of the civilized world owe to Benjamin Franklin a debt of gratitude which will carry his name down to future ages as a benefactor of mankind. Far seeing as he was, he could scarcely have imagined the extensive use of his discovery, the wonderful inventions and progress in which it would result, and could he revisit this city to-night, he would not believe that it was his discovery that made possible the beautiful lights upon your streets and in this auditorium, the power that moves your street cars, that operates your telegraph instruments, and that beneath your streets are thousands of miles of copper wire, over which conversations are being carried on between parties located many miles apart, as clearly and distinctly as though the speakers were in the same room. This indeed is a wonderful age and the telephone is not the least of its wonders.

To return to our subject, the first public record of a device for the transmission of speech over an electric conductor appeared on August 18, 1854, in a magazine published in Paris, known as the "Illustrated Universal Journal," giving an account of a crude apparatus constructed by Charles Boursel, a soldier in the African army, who had attracted attention by delivering a course of mathematical lectures to his comrades in a garrison in Algiers in 1848. Boursel, in describing and explaining his apparatus, made the startling announcement that "The spoken word in Vienna could be instantly transmitted by electricity to Paris." Nothing is on record to show that Boursel made any practical use of his invention, but in 1861, Philip Reis, a teacher in a boys' school in Fredericksdorf, near Hamburg, Germany, came before the public with an apparatus with which he claimed he was "enabled to reproduce the tones of various instruments and even to a certain extent of the human voice." Reis called his invention the telephone, the name by which it has since been known. He also manufactured and sold the apparatus in a limited way. As early as 1860, Daniel Drawbaugh, of Eberly's Mills, Pa., a little town of half a thousand inhabitants, about ten miles southwest of Harrisburg, in the Cumberland Valley, was endeavoring by experiments with the primitive appliances within his reach, to convey vocal sounds over an electric wire. There is nothing to indicate that he ever heard of Boursel or Reis, but between 1857 and 1869 he succeeded in constructing an apparatus consisting mainly of a glass tumbler, a tin cup and a mustard can, connected through a membrane, by means of a wire leading from a battery, with another instrument placed some distance away, over which he was able to transmit vocal sounds of a certain range. The device was crude, and Drawbaugh was not sufficiently skilled to comprehend or explain the scientific principles involved.

On February 14, 1876, two petitions were filed in the United States Patent Office, making application for a patent on the telephone, each describing it as an invention for "transmitting vocal sounds telegraphically." One was a formal application by Alexander Graham Bell, of Massachusetts, the other a caveat on the part of Elisha Gray, of Illinois. It was a coincidence without parallel in the history of the Patent Office, as both covered practically the same ground, and involved the same points. However, the patent was granted to Bell, on March 7th, less than a month after the application had been made. One of the first instruments manufactured was exhibited at the Philadelphia Centennial that year.

Immediately after the patent had been granted, the Bell Telephone Company was organized under the laws of the state of Massachusetts. Later the Western Union Telegraph Company secured control of Gray's device, with im-

provements thereon by Edison, and started in the business of installing and operating telephone exchanges in direct competition with the Bell Telephone Company. The latter realizing that their anticipated monopoly was in serious danger lost no time in ridding themselves of competition. A deal was promptly made with the Western Union, then suits were brought against all of the Bell's other competitors to enjoin them permanently from using telephone apparatus. This case reached the United States Supreme Court in 1888, and was heard before seven judges, four favoring the Bell company and three dissenting. The dissenting members of the court based their opinion on their belief in the priority of the invention of Daniel Drawbaugh of this state.

The Bell company, being put in possession of the controlling patents by the United States Supreme Court, and having made their arrangements with the Western Union to keep out of the field, apparently felt there was nothing further to fear from competition. Accordingly they continued the business policy which they had inaugurated, charging exorbitant rates and restricting the service, preferring to do a small business at high prices to popularizing the service at reasonable rates. The treatment of patrons, as might be expected from a gigantic corporation having such a complete monopoly, was arbitrary in the extreme.

The telephone business of the country continued with this policy of management until the patents expired in 1894. In December of that year, there were 291,253 complete telephones installed in the United States, or approximately one for every 240 persons. By this time, the public had become so thoroughly aroused over the fact that they were prohibited from enjoying what seemed to them a wonderful convenience, if not an absolute necessity, that people from all walks of life in every community were ready to go into the business, not so much with a view of financial gain as for the purpose of securing the telephone service they needed. The Bell management felt certain that the invention of Emile Berliner, whose patents they had purchased and which were filed in the Patent Office June 4, 1877, but not issued until November 17, 1891, would prolong the monopoly of the business until at least 1908; so when competition was threatened, every officer of an Independent company, as well as every subscriber to an Independent telephone, received a notice from the Bell Telephone Company that they were infringing patent No. 463,569 of Emile Berliner, which the Bell owned, and that they would be held responsible for infringement and damages. Nor was this an idle threat; in nearly every instance previous to 1888, upon the rendering of decisions favorable to the Bell, Independent companies were driven out of business and their equipment reduced to scrap and burnt, widespread publicity being given to such cases as a warning to other foolhardy investors, who might dare to invade the field of the Bell monopoly. It required courage in those days to engage in the Independent telephone business, when the investors faced the prospect of being prosecuted for infringement, and having their property confiscated and destroyed. Yet courage and faith were not lacking among the pioneers of the industry, and the present extensive system is a monument to their daring and perseverance.

Feeling the hopelessness of fighting the Bell single-handed, some of the prominent men in the Independent movement invited representatives of all the known companies in the United States to come together in Detroit, Michigan, on June 22, 1897, for the purpose of forming an organization for mutual protection. This organization was effected, and a substantial sum subscribed to defray the expenses of fighting the patent cases through the Supreme Court of the United States, if necessary. One after another these cases were carried through and won by the Independent interests.

Telephone apparatus at the time the patents expired in 1894 was very crude, the service was slow and transmission unsatisfactory. To supply the widespread demand for apparatus, Independent manufacturing companies started up almost immediately, improvements were made on the apparatus, competition between the different interests put all on their mettle, and more was accomplished between 1896 and 1900 in the way of improving the apparatus and service, and extending the use of the telephone, than had been done in twenty years previous. Prior to 1896, a telephone in the country was a decided novelty; to-day it is so common as to attract no special attention. After establishing themselves in the smaller cities, the Independent extended their lines out into the country, reaching all the postoffices in a county; then the farmers began to organize companies and build, bringing their lines into the different postoffice centers where exchanges were installed, each county becoming a network of wires. This service has been constantly increasing, finances for its development being in most cases furnished locally, until to-day there is over three hundred million dollars invested in Independent telephone properties, with more than three and a half million telephones installed and several hundred thousand miles of long-distance toll lines connecting the different exchanges. The people in many of the larger cities, where the Bell was furnishing telephone service, were slow to appreciate the advantages to be derived from competition. They realized very often that they were paying more than their service was worth, and that there was a great deal of room for improvement in both the service and treatment, but dreaded to burden themselves with two telephones, "the double telephone nuisance" as the Bell taught them to consider it. In many cases where the citizens were willing, in fact anxious to have an Independent exchange installed, they were prevented through the Bell's control of their chosen representatives, who sometimes placed their own pecuniary gain above the welfare of the people they were elected to serve. If this entire history was written up by Miss Tarbell or some of the other well-known writers, who have made a specialty of corporate methods, it would prove equally interesting and enlightening as the record of the Standard Oil Company or any of the other great trusts. One by one, however, the Independents have won their fights for entrance into the larger cities, the common sense of the citizens, when the real facts regarding telephone competition had been made clear to them, demanding Independent companies as the only means of securing justice in telephone rates and service.

Sometimes the Independent companies, in the early days, after obtaining franchises were unable to develop their property in the face of the greatly reduced rates, or even absolutely free service promptly offered by the Bell company, and were forced to retire or sell out to the monopoly. Wherever this has happened, with scarcely an exception, another Independent company has been formed, proper provisions being made to prevent a like occurrence. One or two examples may not be amiss. A few years ago an Independent plant was installed at Portland, Oregon, and forced the Bell to reduce its rates and improve service; it was not strong enough, however, to withstand the continued attacks of the Bell company, backed by other corporations and political power in control, and finally sold out; rates were at once raised and service became unsatisfactory from an operating standpoint. On December 7, 1904, an application for another Independent franchise was presented, and after a fight which brought the matter into politics, upon the petition of 10,000 voters the matter was submitted to a vote of the people the following June. The result was 12,213 votes for and 560 against the franchise. Evidently the citizens of Portland prefer competition to monopoly after having tried both. At South Bend, Indiana, the first Independent company was forced to abandon the field, but

its successor to-day has over 3,000 telephones in South Bend against about 900 of the Bell, although the rates of the latter are the lower at present. In the entire county the Independent have 5,000; the Bell about 1,000. Perhaps the South Bend people do not forget that it was not until competition was introduced that rates were lowered, and that when the first Independent company had been removed from the field rates were promptly raised. No doubt they also appreciate that the present extensive development is due to competition, for under monopoly the Bell had only 240 subscribers, and showed no disposition to extend its service.

On November 6th, the citizens of Omaha, Nebraska, at the regular election ratified an Independent franchise by a vote of 7,653 to 3,625. The Independent victory there marks the close of as fierce a fight as the Bell has ever made in any city of the country against the entrance of competition. For over three years this struggle has been going on, the Bell using every influence and sparing no expense in its efforts to retain its monopoly. There is a reason for its activity, for with Omaha added to the Independent list, the Bell's one claim to the toll service of the country surrounding it has disappeared, since in all of the territory tributary to Omaha the Independents outnumber the Bell. In Nebraska the Independents have approximately seventy-five thousand (75,000) telephones. In Iowa the Independents have over one hundred and eighty-five thousand (185,000), a total of two hundred and sixty thousand (260,000) in the two states; the Bell has only, approximately eighty thousand (80,000) in the same territory. With Omaha built it will give the Independent companies at least forty thousand (40,000) additional telephones in the two states in three years, and completes the system in that section.

At the November election, Denver, Colorado, also voted in favor of an Independent franchise. Last summer one was granted at San Francisco, and within the last ten days the Independents have been given a franchise at Milwaukee. These cities with Omaha are the only ones of special consequence, except Cincinnati and Chicago, west of the Ohio river, where the Independents are not strongly intrenched or building. In Chicago a franchise has already been granted and the Independent company has over forty miles of tunnel under the city streets, this tunnel also being used for hauling freight. The telephone part of this property is controlled by a number of Chicago citizens and railway and telephone interests surrounding the city. It has lately been leased with all franchise rights to a syndicate of well-known active Independent operators, who have completed their arrangements to see that it is fully developed, and Independent long-distance connections given the numerous cities surrounding the metropolis, who have been clamoring vainly until now for such connections.

Speaking of the Bell Telephone Company, and its "iron grasp" upon the city of Chicago, Corporation Counsel Lewis said, "Here in this community there is no monopoly which has seized her more ruthlessly, which has ground her more oppressively, or which has more outraged or wronged her people than the telephone company." In the very near future this "ruthless," "grinding," "oppressive" monopoly will be once more forced to reckon with Independent competition, which there is no reason to doubt will bring the same relief to the citizens of Chicago as it has to those of other places.

In other lines of business, competition has been the life of trade; the telephone business has not proved an exception. When the electric light was invented, many of the (artificial) gas companies that had been charging from $3.00 to $4.00 per thousand cubic feet were inclined to believe that their business was ruined. Forced by necessity, they began to study their economies, and by marketing their by-products and the introduction of new devices for the use of fuel gas, they were enabled to develop a day and night load, as well as a winter and summer load, which made it possible for them to reduce the price of gas to an average of $1.00 per thousand cubic feet, bringing it into competition with coal for cooking and heating. To-day there is practically no limit to the amount of light and heat required in this country. So it is with the telephone; there is more business in this country to-day than both systems can properly take care of, and the more rapid their development, the greater will the demand become until everyone desiring telephone service has been satisfied—and who can say whether that condition will ever be reached?

There are approximately 7,000,000 telephones connected with both the Independent and Bell exchanges in the United States. If the development throughout the country was as great as in some counties of the central states, it would require at least 14,000,000 telephones, twice the number at present installed. Without competition, there would be less than 2,000,000 telephones in the United States at present; equipment would be crude, rates high, the service unsatisfactory, and the management arbitrary. The small towns and the rural districts and millions of residents and small business men in our cities would be deprived of the greatest convenience of modern times. Not only has competition as represented by the Independent companies offered lower rates, better service through the use of improved apparatus, more courteous treatment, and developed territory hitherto untouched, but it has forced the Bell to do likewise in sheer self-defense. While installing its own 3,500,000 Independent instruments, competition has compelled the Bell to increase in eleven years to ten times the number of telephones it had in service at the expiration of its more than seventeen years of absolute monopoly.

See what competition has done in your own city. Prior to 1900, when the Keystone company secured their franchise, you are reported to have had approximately 10,000 telephones; to-day, six years later, you have approximately 70,000 telephones with a superior service and more reasonable rates. The experience in other cities is similar. Cleveland had less than 6,000 telephones when competition was started in 1900, and to-day there are approximately 50,000 telephones; business rates have been reduced from $120.00 to $72.00 per annum; residence rates from $72.00 to $48.00, with party-line residence rates as low as $24.00 per annum, thus bringing the telephone within reach of all the citizens. The same results have followed the introduction of competition in all of the cities of any size, while the smaller places and the rural districts were deprived of the service entirely until furnished by the Independents.

I should like to call your attention to the present situation in Canada, where the Independent movement is of very recent growth, and the business still largely a monopoly, conditions analogous to our own a few years ago. I think a study of the situation there will convince the most skeptical that the extensive development of the telephone in the United States is directly due to competition.

Recognizing the necessity for improvement in telephone conditions, the government of Manitoba appointed a select committee to inquire into and report regarding the various telephone systems. A similar committee had been previously appointed by the Dominion government and had held its sittings in Ottawa; testimony taken before it filled two large volumes of an average of about one thousand pages each. The Manitoba committee, after making a thorough investigation of its own, and carefully considering evidence presented before the Dominion committee, reported to their assembly. This body, after careful deliberation, decided to take the necessary steps to enable the Manitoba government to construct and operate its own telephone system, and to petition the Canadian parliament and the crown to permit the expropriation of the Bell Telephone

Company's plant and to refuse an extension to that company's capital. The Honorable Colin Campbell, attorney-general of Manitoba, in a speech before the assembly, attributed the telephone legislation "To the growth of the Independent telephone companies in the United States, to the costly and limited service of the Bell Telephone Company, and the natural objection of the people of Canada to a monopoly."

The decision of the committee, as set forth in its report and the debate with reference to the proposed legislation, was that the telephone is a necessary part of civilization, and is such a public utility that it should be operated to serve the people as a whole, and give to everyone an opportunity to enjoy its advantages at the lowest cost. It was pointed out that the system of telephones cannot be considered complete until every residence, including the farm house in convenient places, has been connected with every other; that the use of the telephone will continue to increase until it has been installed not only in every place of business, but in the home of every citizen. Special stress was laid upon the need of the telephone in the homes of farmers. It was urged that the present rates charged in Canada for telephone service are exorbitant and that a considerable reduction could be made; that the rural telephone system is absolutely neglected and discouraged at present; that the service of the Bell is unsatisfactory and too costly, and that no progress can be looked for from that corporation.

The League of Canadian Municipalities concurs in this view. In a letter to the postmaster-general of Canada, who conducted the inquiry held at Ottawa, the secretary of the league, in setting forth the views of that body, says: "There is very widespread conviction, based on what appears to be a solid ground of fact, that the Bell company's rates are far higher than they ought to be. If my own inquiries into the matter are of any use, and I may say that I have followed it without any prejudice, weighing many statements and much published matter on both sides, I consider that the progress of the use of the telephone as a home comfort among the mass of our people is immensely retarded by the present virtual monopoly."

In commenting on the progress of the Independent companies in the United States, the committee reports that "everywhere the entrance of such companies into the field has resulted in the furnishing of satisfactory service at much lower rates than had previously obtained and in the immense extension of the use of the telephone. A noticeable feature of the telephone development in the United States was the large number of long-distance lines and lines giving intercommunication in rural districts." The report further states "That it has been demonstrated to the committee that long-distance communications to the South may be easily obtained through the Independent telephone companies in the United States."

It goes on to show that the general result of competition in the United States has been an immense extension of the telephone in all directions, and especially to the farmer, and a great reduction in rates; that in many cases both telephones could be rented for the price formerly paid for one, and that in places where the charge for both telephones is higher than for one, it was inconsiderable and more than compensated for by the increased and improved service. Regarding the relative desirability of the single or dual systems, Attorney-General Campbell says: "I agree that it is undesirable to have two companies if possible to obviate such conditions, but if we cannot get competition we cannot get a reduction of price, and if we can only get the benefit of competition for the people by entering into the operation of telephones, both as a province and as municipalities, I think we would be justified in so doing."

Among the evidence considered by the committee were communications from business men regarding the actual working of telephone competition. The following is a summary of 1,400 answers from 189 exchanges in the United States to five questions addressed by an American banker to leading business men at such places. This evidence is valuable, coming, as it does, from our fellow-citizens who are users of the telephone:

Question 1. Has competition resulted in better telephone service in your city? (a) As given by the Independent telephone company? Answers—Affirmative, 1,245; negative, 26.

(b) By an improved service on the part of the Bell company? Answers—Affirmative, 982; negative, 154.

Question 2. Has competition increased the number of telephone subscribers? Answers—Affirmative, 1,251; negative, 8.

Question 3. Has competition brought about greater civility and more courteous attention to the wants of the subscribers? Answers—Affirmative, 1,222; negative, 37.

Question 4. Have the rates for telephone service been reduced by the advent of competition? (a) By the reduction of Bell rates formerly charged? Answers—Affirmative, 979; negative, 120.

(b) By the establishment of rates by the Independent company lower than formerly prevailed? Answers—Affirmative, 1,236; negative, 45.

Question 5. In your judgment, would it be preferable to return to the conditions prevailing before the advent of the Independent company? Answers—No, 1,245; yes, 14.

Of this last fourteen, all but five qualified their answers, favoring a return to a single system only upon condition that they would be given the same service as they were now receiving and at the same price. Many of the other answers were very emphatic in opposing a return to conditions existing before competition.

The Manitoba government, recognizing the futility of attemping to secure better telephone conditions from the Bell, is determined to establish a governmental system, and will endeavor to obtain the power to expropriate the Bell plant; should this be denied, however, it will nevertheless, if the people approve of the policy, build its own lines and exchanges, believing that competition will accomplish the desired results, as it has in the United States.

The Union of Manitoba Municipalities at a meeting last week, after spending two days in listening to testimony from telephone experts and officers, and then devoting a half day to discussion, at the close of its session, by a vote of eighty-six (86) to nineteen (19), passed a resolution recommending the municipalities in the province to put in their own telephone systems in competition with the Bell. As already stated, telephone competition in Canada is practically in its infancy. The Bell Telephone Company had made exclusive contracts with many of the railways and other corporations, some of which are now expiring. This, prior to the last two years, had made it almost impossible for the Independent companies to obtain a foothold. At the close of 1904 the Bell had approximately one telephone for every ninety (90) inhabitants. Their last report shows 78,195, or one to every seventy (70) inhabitants. The Independent companies in the meanwhile have installed 12,500 telephones, and everything indicates that they will make a gain of 200 per cent in the coming year. In the state of Indiana, which has a population of approximately one-half of the Dominion of Canada, there is one Independent telephone for every fourteen persons, and in that state the Independents outnumber the Bell about three to one.

The Independent telephone interests to-day have a good organization, known as the International Independent Telephone Association of America. The organization formed in Detroit in 1897 for the purpose of defending damage cases brought by the Bell, finished its work by winning the last of the patent cases in 1904. In 1905 the association was re-

organized in Chicago under what is known as the "Ohio Plan." This plan starts with an organization in each state, which usually divides it into districts to suit local conditions, each of the districts having a complete organization of its own, subject to the control of the state body. The various companies are represented on the basis of the units they operate, a unit being one telephone or circuit mile of toll line. The district organizations select delegates to the annual meeting of the state association on the basis of one representative for every one thousand units operated by their members. One delegate to the International Convention is allowed for each 10,000 units in the state. Each district selects a delegate to this convention, the remainder necessary to make up the full quota being elected at the state meeting as delegates-at-large. At the district meetings all questions with reference to traffic conditions between the companies, the development of territory, etc., are considered. At the state meetings matters of general importance to the movement in the state are taken up.

The International Association holds its annual convention between May 1st and July 1st. Permanent headquarters are maintained in Cleveland, where a corps of secretaries and a map maker are employed for the purpose of keeping in touch with the development in the various states. At present there are over 7,000 Independent companies operating in over 12,000 cities and villages.

Our plan of organization is not a new one; it is based upon the federal plan of government, which has been in use in the counties, congressional districts and states of the Union for more than a century. I believe it was Benjamin Franklin who first proposed a plan of this kind in 1754. It was known as the Albany plan, and outlined the formation of a separate government in each of the colonies, to be brought together in a central government for all of the united colonies. The plan under which our association is operating seems broad enough to cover every possible contingency in keeping the Independent interests working together in harmony and as a complete system. It is often difficult for those not interested in the Independent telephone business to understand the enthusiasm of the people engaged in it. It is more than a mere means of livelihood to them; it is a *cause*, something worth fighting for. Perhaps this is true of any particular line of effort, but in no others I think to such an extent as in the Independent telephone business. This feeling is probably due in a measure to the interest attaching to the development of the industry, but more, I believe, to the conviction of practically all engaged in it that they are doing their part in a movement to benefit mankind. This feeling was never better expressed than by Judge Robert S. Taylor, who was appointed by President Cleveland to represent the United States government in the famous Berliner patent case. Judge Taylor, in addressing a meeting at Chicago last summer, said: "I have never done anything in my life which I did with so much heart and so much earnestness as the fights I have made for Independent telephony. I have never done anything I have felt so well satisfied with. I have always considered that no movement in this country that has ever taken place carried with it so much of a blessing to the people as the Independent telephone movement."

Aside from its many commercial and social advantages, the telephone has performed a very important part in advancing civilization, and there is little doubt that there would be much more crime in the United States to-day were it not for the extensive use of the telephone. This, I think, is particularly true of the rural districts. The use of the telephone has lessened profanity; it is seldom that a profane word is heard over the wire; it has broadened all who use it to any extent in the choice of their language; something seems to prompt people using the telephone to talk their best. Of course, there are exceptions, but very little investigation on the part of any one will demonstrate the general truth of the statements just made.

There are to-day and will continue to be two great telephone systems; one, as at present, controlled and operated as a trust; the other, the Independent, operated as a complete system, reaching practically every farmer, all of the towns, and every important business center in the United States and Canada. The control of the securities and the management of the various companies making up this system to remain with local people. Consolidations will undoubtedly be made here and there to bring these companies into convenient groups, which in many cases will be county groups or congressional district groups, tributary to large centers, reaching out a distance of fifty to one hundred miles. In my judgment, and I am by no means alone in this view, it would be unwise to consolidate them as one system, if, indeed, such a thing was possible. The telephone business is very largely a business of detail and requires the most careful management. This management must be in close touch with the other business interests of a community. No community can afford to depend upon a monopoly to supply its telephone service for the following reasons and many more that might be enumerated:

Competition: First—Guarantees fair rates. Second—Secures at least fair management and courteous treatment from both systems. Third—Stimulates the best thought of inventive minds in improving the apparatus and the careful study of operating conditions with a view to greater efficiency.

Another advantage of competition—and I wish to call special attention to this because it is so often overlooked by the champions of a single system—is the almost absolute assurance it offers to the subscribers of both systems against being deprived by accident of their telephone service. Even if the 70,000 telephones in your city were controlled by one company, many of your business men would still be compelled to have at least two telephones to take care of their business. In case of exchange trouble, fire, strikes, cable or line trouble in any particular section, you might be completely deprived of the use of your telephones until such trouble had been cleared. With instruments connected to both exchanges, the chances for this are almost entirely obviated. It is very seldom that both of your instruments will be out of order at once. The advantage of this until demonstrated by actual experience, as it has been in many cases, is not generally appreciated.

The increase in the use of the telephone has so far exceeded the anticipation of the most optimistic that it is hard to predict what it will be in the future. It is estimated that the United States will have a population of 200,000,000 in 1950; that population will require at least 50,000,000 telephones, more than seven times the present number. The telephone while increasing in usefulness will also be made a still grater means of pleasure and entertainment, and will be utilized for the transmission of concerts, sermons, political addresses, etc., in fact, the Keystone Telephone Company of your city is now experimenting with such service.

Already the "seeing telephone," as exemplified in the "Televue," has been invented by J. B. Fowler, of San Diego, California. Long before 1950 this or a similar device will have been perfected, and by means of it, one may not only converse over the telephone, but actually *see* the person with whom he is speaking. Through the use of such a device, the police department will be able to transmit not only the description, but the photograph of a criminal wanted and to identify one instantly no matter where captured. Think of the convenience of shopping by telephone when one can not only order but view the goods purchased. When the telephone has been brought to its highest stage of usefulness, as our friend, Mr. Dooley, remarks, "th' legs will be as good f'r nawthin' as the appendix."

This talk would be incomplete without some reference to Independent telephone securities, for the progress of any industry, no matter how useful, depends upon its ability to show proper returns upon the capital invested and to secure the capital necessary to its development. There is no reason to believe the Independent movement will be hampered through this cause. Already its securities are being favorably regarded by investors everywhere and they will, beyond question, in the very near future take their place on a par with the securities of other public serving corporations. There is no other utility which is in greater demand than the telephone, and statistics prove that panics have less effect on the gross income of wire using companies than on any others. It has been demonstrated that subscribers will economize, not only in luxuries, but in their very necessities, in every way possible before giving up the telephone, and the telephone will continue to increase in usefulness and become a greater benefit and a more absolute necessity than at present. Thus the securities of the Independent telephone companies offer a safe and remunerative form of investment, and this fact thoroughly appreciated, there will be no lack of funds to develop the industry.

Telephony is desirable as a career for the young man. The electrical field is a broad one and experts do not believe that we have more than commenced to develop it. The telephone branch of the business offers peculiar advantages and attractions. With the marvelous growth there will come a demand for thousands of well trained young men in this field of labor. Already telephone courses have been established at universities and colleges, and the demand for some of the technically trained students is so great that employment is offered them before they have finished their course. As telephony progresses the men with technical training will be more and more in demand. I, therefore, commend this branch of the electrical field to the students of all technical schools as one worthy of their consideration. They will find that it not only offers them employment, but will give them splendid opportunities for careful study and the development of economies and new improvements that will result in financial benefit to themselves and be of untold advantage to mankind.

ELIMINATION OF DANGER IN THE TELEPHONE FIELD

By A. L. Stanton

THE subject about to be discussed is one that has under various heads been more or less well handled in previous numbers of TELEPHONY. It is, however, a subject of such vital importance that a reminder of the hazards run by inefficient construction or an indolent manner in the maintenance efficiency of the protective elements of any large system cannot be too forcible, although the risks attendant are, in general, given due recognition. However, the problem of efficient protection as viewed to-day differs widely from existing conditions a few years ago, due essentially to the rapid spread of power transmission and electric traction lines. This is, in particular, applicable to the western states. Unforeseen conditions have arisen, where proximity to power routes have proved the inadequacy of existent protective apparatus, disorganizing service and causing fires which have done considerable damage. In other cases linemen have met sudden death while on duty, and in other instances operators at central office got a bad scare. The problems for rendering a system absolutely immune from danger are numerous, varying with surrounding conditions, and although such incidents as referred to are fortunately rare in occurrence, they do occur, proving the need for greater care and attention to detail. I will quote two instances. The first case is one probably known to all, which occurred last year in London, when the National Telephone Company had its test room burn out. The cause of this was surmised as being due to a piece of iron troughing bridging the live rail on the underground electric railway system with the sheathing of a telephone cable. As a result fires broke out at centers fitted with test frames of an old design and *not equipped* with heat coils, a noticeable feature being that of other test rooms having circuits in the same cable but connected with heat coils on a modern type frame the heat coils were fused but no fire ensued. Doubtless the cable was fixed without the slightest conception of such an accident being possible. The second instance is one where I personally viewed the results a few months back and was caused as in the previous instance under circumstances not common. A few miles from the central office affected blasting operations as carried out for the clearing of land were in progress. During the course of these a stump was blown up, which in falling crossed several long-distance open wires with the live trolley wire of a traction system running down same roadway. This resulted in a fire at the near central office which did several thousands of dollars' worth of damage. A considerable arc occurred at the main distribution frame where cable junction was effected, a noticeable fact being that on one of these toll lines the heat coils were cut out. The explanation is as follows, and it is the first circuit I have known designed for such a purpose. The heat coils in use each averaged 30 to 40 ohms in resistance. This was considered as objectionable in the speaking operation, therefore the circuit was arranged in a manner that in the insertion of a plug into jack the heat coils normally in the circuit were cut out to reduce the total resistance. The modern type high tension carbon arresters were in circuits but these failed to arrest the primary cause of the fire. One of these circuits was plugged up at the time. It is not proposed here to discuss the utility of such a designed circuit. Facts are quoted as of interest in details which seem usually on a burn out occurring difficult to obtain. The dangers risked by a telephone company and the elements in modern systems are well known, but throughout the whole subject of efficient protective equipment not much data seems available relative to tests or experimental investigation on the part of manufacturers. What appears to be a real danger although of remote occurrence is the setting up of arcs, on a telephone circuit becoming crossed with a foreign line carrying in addition to fair voltage value plenty of power. The apparent requirement, which present combination protective devices do not appear designed to meet, is a means of choking and destroying such an arc on its being set up. This seems to be the primary cause of all recent burn outs where standard efficient protective equipment was supposed to exist. A consideration as an important element of efficient protection lies in the careful survey and construction in all telephone systems of standard routes which do not allow of any possible crosses with foreign lines of a dangerous nature. The additional expense is money well spent. Finally, efficient maintenance is a great factor of good protection, low resistance ground connections and good grounds being a desideratum with periodical tests as a security against neglect.

MANSON'S PRACTICAL SUGGESTIONS

A Series of Short Articles Dealing with Important Phases of Telephone Work

By Ray H. Manson

SIMPLEX TELEPHONE AND TELEGRAPH CIRCUITS.

THE simplex system of telephoning and telegraphing over a metallic circuit by means of repeating coils not only gives very satisfactory results, but is inexpensive to install. Outside of the regular telephone and telegraph equipment, the only apparatus necessary is a bal-

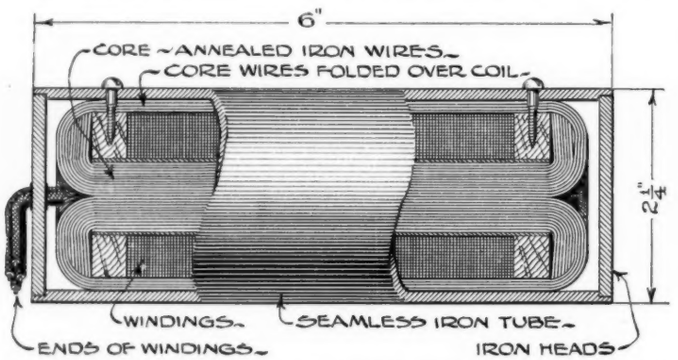


Figure 31. Ring-through and talk-through repeating coil with parallel windings for use in simplex circuits.

anced type of "ring through" repeating coil and some ordinary telephone condensers.

This system is adapted for use on any existing balanced toll line which has all of the talking and signaling apparatus bridged across the metallic circuit, the two line wires being used together as one side of the telegraph circuit and the earth employed as a return, the same as in a phantom telephone line. Repeating coils are required in each end of the toll line so as to leave the same free for telephone conversations and signaling regardless of the connection of the telegraph circuit. In other words, several toll lines can be connected together for a through telegraph circuit and each line used for separate toll conversation.

As the success of both the telephone and telegraph portions of this system depends on the repeating coil, it should

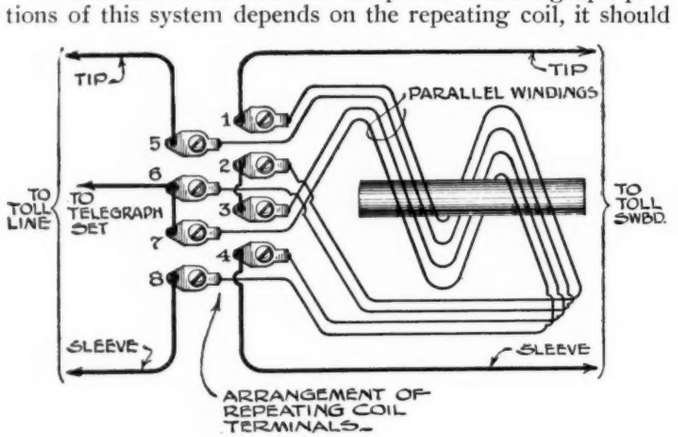


Figure 32. Arrangement of the four windings of the repeating coil shown in Figure 31. The external connections shown by heavy lines are for simplex circuits.

be selected with care. The principal requirement of this coil is perfect electric balance, which is best obtained by winding the wire of the four quarters in parallel. One particular coil of this description is made by twisting four double silk covered copper wires into a small cable, after which the latter is wound on a repeating coil spool in the regular way. This method insures an equal number of turns, the same distribution of wire on the spool and uniform resistance for the four windings.

The general dimensions and construction of this repeating coil are shown in Figure 31. The core is made up from a bundle of very soft (annealed) iron wires with their ends turned back over the outside of the winding so as to overlap and complete the magnetic circuit, thereby making a most efficient coil for repeating low frequency ringing currents. The coil in this form will cross talk into adjacent coils unless it is provided with an outer sheath of heavy iron for confining the magnetic lines, due to its action, within its limits. Each of the four windings of the coil has about three thousand turns of wire and a resistance of about 140 ohms. The ends of the four windings are brought out to eight terminal clips, the wiring being as shown in Figure 32. The proper line connections to this coil and the neces-

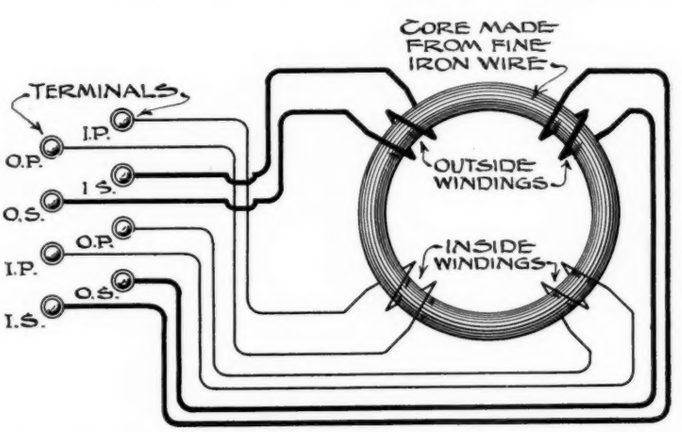


Figure 33. A repeating coil with a ring type core having separate windings so as to do away with static leakage.

sary strapping between terminals for simplex service is also shown in this diagram.

Another type of repeating coil used for simplex service employs a ring shaped core, made up from very small annealed iron wires, over which the four separate coils are wound as shown in diagram in Figure 33. One of the advantages claimed for this construction is the doing away with static leakage between the two halves of the coil when connected in a telephone circuit.

By referring to Figures 34, 35 and 36 the reasons for a carefully balanced and constructed coil are made apparent. Figure 34 shows a telephone toll line with two repeating coils *A* and *B* at either end, bringing telephones *E* and *F* located between the coils, also bridging telephones *C* and *D* located on the extreme ends of the circuits, the latter representing two exchange subscribers connected through for a long distance conversation. A telegraph circuit is also shown legged off from the middle of the line halves of these coils. The telephonic transmission between the stations *C* and *D* and through the repeating coils *A* and *B*, also the transmission of generator current for ringing purposes, is done in the regular way with only a slight cutting

down of efficiency, this loss being practically all due to the presence of the repeating coils.

Stations E and F will also work with practically no ill effects, due to these repeating coils, for the reason shown in Fig. 35. This diagram illustrates the middle portion of Figure 34, between windings *1-4* of the two repeating coils, when a telephone conversation is taking place or when a telephone generator is being operated to signal another station. For example, if an electrical impulse is originated in the telephone E and passes to the tip of the line, it will find a ready path through the telephone at F and back to E through the sleeve of the line as indicated by the arrows. It will also find paths through the windings of the two coils A and B as indicated by the small arrows. These leakage paths, however, will not be of any consequence as the impulses of current through the two windings *1-2* and *3-4* of the coils are in the same direction so that they will act together as one winding and give high impedence to the fluctuating voice or signal current. Furthermore, there will be no tendency for these currents to be diverted through the earth return path, consisting of the telegraph sets G and H as the latter are tapped from the middle points of the repeating coil windings as clearly shown in Figure 34.

Figure 36 illustrates the condition of the previously described circuit when an impulse of current is set up by closing the telegraph key at H. The current from battery K will divide at x, one-half going through the winding *1-2*

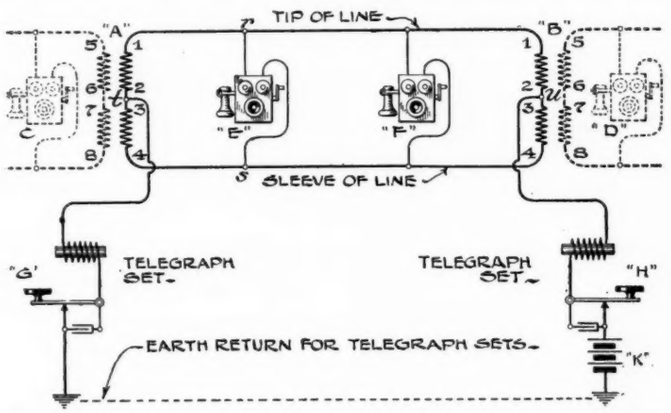


Figure 34. Diagram of a simplex circuit showing how a repeating coil is used to make the telegraph circuit from a metallic telephone line.

and the remainder through *3-4* of the coil B to the tip and sleeve, respectively, of the line. After passing through the two windings of coil A, the current is united at y and finds a return path to battery through the telegraph set G and the earth. The current in the winding *1-2* of the coil B is in the opposite direction to that in winding *3-4*, as indicated by the small arrows, thereby neutralizing the magnetic effect or retardation so that the telegraph current is opposed only by the actual "ohmic" resistance of the copper wires of these coils. The resistance to the telegraph current is still further reduced as these two coil windings are in multiple to the telegraph circuit, therefore, offering but one-half of the resistance of one winding.

There will be no noise caused in the telegraph sets, due to the current changes in the telegraph circuit, provided the resistance of the coil windings is equal and the resistances of each side of the line are the same. Under these conditions there is a zero difference of potential between the tip and sleeve line wires at any point as at r and s of Figure 34, the same as in a balanced Wheatstone bridge.

Two of the balanced arms of this bridge are represented by the resistance of the circuit from t to r through winding *1-2* of coil A and from t to s through winding *3-4* of coil A, while the two other balancing arms of equal resistance are represented by the circuits u to r and from u to s through windings *1-2* and *3-4* respectively of coil B. The bridge battery is represented by the telegraph battery k, which is connected to the point u and through the earth return to the point t. The bridge galvanometer is represented

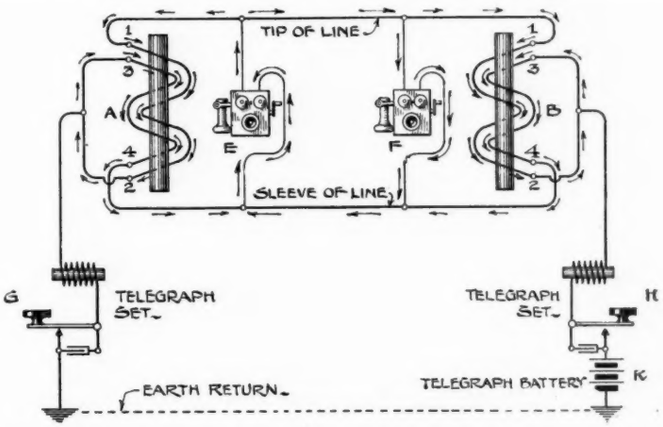


Figure 35. Diagram of the middle portion of Figure 34, illustrating the retardation effect of the repeating coil windings for telegraphic transmission or signaling current when connected across the metallic circuit.

by the telephone at E and has no current passing through it, due to battery K, as the arms of the bridge are in a balanced relation.

In practice it is impossible to obtain perfect balance of the line resistances, therefore, slight disturbances will be produced in the talking circuits when the abrupt electrical signals of the telegraph are impressed on the circuit, but this can be eliminated by using a condenser around the contact of the telegraph key, or around the key and telegraph relay coil, so as to smooth out the telegraph current. The first method of locating condensers seems to be preferable as it does not slow down the operation of the telegraph relays. The condensers will also serve a second purpose, to prevent arcing at the key contacts.

Ordinary rolled tin foil and paper condensers of one or two microfarads capacity, such as are used in telephone circuits, are employed for this purpose, but it sometimes requires as great as ten microfarads to produce the proper results. The exact capacity necessary is best determined by experiment and can be obtained from several smaller capacity condensers placed in multiple.

Figure 37 shows in diagram a simplex circuit including

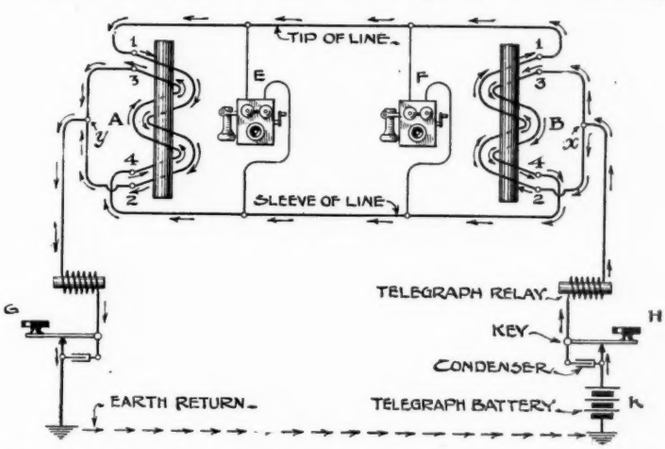


Figure 36. The same diagram as Figure 35, showing the absence of retardation in the repeating coils to the telegraphic currents.

four exchanges and three inter-connecting toll lines arranged according to the foregoing principles. It is necessary that all of the telegraph stations be connected in series

and that no earth returns be provided, excepting at the extreme ends of such a circuit.

The telegraph system used in this illustration of the simplex circuit is of the so-called Morse closed-circuit type in which the current is normally flowing at all times when the circuits are connected and not in actual operation. The signals are produced by opening the circuit at one point with a key in accordance with the standard Morse code.

The telegraph instruments for each station in the simplex circuit include a main line telegraph relay with adjustable magnets, a sounder, and a telegraph key with side

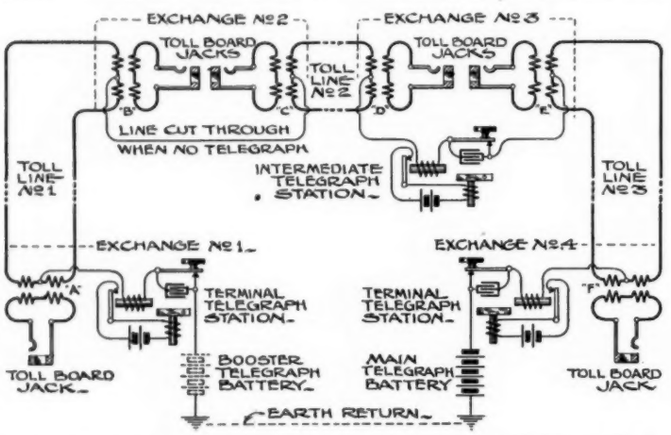


Figure 37. A simplex circuit made from three toll lines and provide with two terminal and one intermediate telegraph stations.

switch. All of the relays in any one circuit must be of the same resistance in order to work uniformly, this resistance being usually taken at 150 ohms. The sounders, however, can be of low or high resistance according to the source of direct current available to operate their local circuits. When a separate battery is necessary for this purpose a four-ohm sounder will give excellent results, but when a high voltage direct current can be obtained, a twenty or fifty-ohm sounder is used, current regulating resistances being provided as subsequently described.

One authority on telegraphic subjects gives the approximate amounts of current required for best results for the various telegraph instruments as twenty-five hundredths of an ampere for a four-ohm sounder, one-tenth of an ampere for a twenty-ohm sounder, and two-hundredths of an ampere for a 150-ohm relay. These amounts are based on the magnet windings of the various instruments having a total of about 950 turns, 1,870 turns and 8,650 turns, respectively. From these figures the necessary voltage required in the main line and local sounder circuits can be readily figured by Ohms' Laws, a factor of safety, however, being necessary in the case of a main line circuit due to line leakage.

The current for operating the main line relays can be obtained from any reliable direct current source, such as a 110-volt lightning or power circuit, a small dynamo, a storage battery or a closed circuit type of primary battery. When small dynamos or batteries are used their electro motive force should be from 30 to 150 volts according to the character of the lines served.

The high internal resistance of the gravity of crow-foot type of primary cell (standard closed-circuit telegraph battery), which is about two ohms, limits the number of main line telegraph circuits which can be successfully worked from one set of these cells to not more than two or three. From thirty to two hundred gravity cells are often necessary to give the proper voltage and current to operate a telegraph system, these cells being arranged in series and located at either one or both ends of a connected circuit.

When the local sounder circuit is operated from a gravity battery, its resistances can be four ohms, thus requiring two cells for best operation. The total resistance of this local circuit, including the internal resistance of the cells, will be practically eight ohms, and with two cells in series an electro motive force of two volts is obtained so that the current in the circuit will be practically twenty-five hundredths amperes. As has been previously stated this is the proper amount of current for best results in a four-ohm sounder circuit.

The storage battery with its extremely small internal resistance serves as an excellent source of current for main line telegraph circuits, but both regulating resistances and fuses will be necessary for protecting each tap to a local or main line circuit. In other words, each circuit must be individualized so that what happens in one line will not affect the others. The storage cells are arranged in series with taps brought out so as to give the several different voltages necessary for the various line conditions. In some cases as high as 150 volts might be necessary but the lowest electro motive force would probably never be less than thirty volts.

It is standard telephone practice to ground the positive terminal of the central office battery so that the flow of current will be to earth rather than to line, thereby doing away with electrolytic action due to line leakage. This same practice is applicable in the case of the main line telegraph battery and can be used in the simplex circuits herein described, although the diagrams are shown with a reversed polarity of battery.

The resistances for protection purposes are made at least two ohms per volt so that in case of a short circuit or cross in the telegraph windings the current is limited to less than one-half an ampere. These resistances are best non-inductive in character, incandescent lamps, wire wound non-inductively on spools and wire embedded in enamel, being used for this purpose. They are adjustably arranged in the

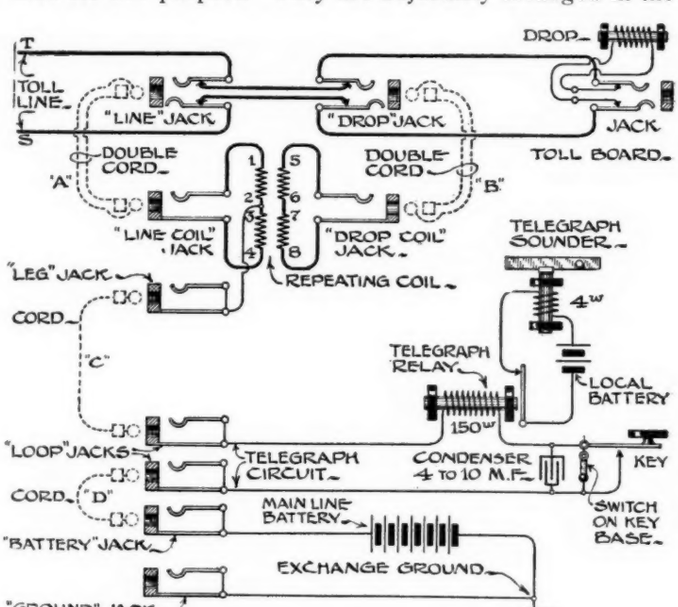


Figure 38. Diagramatic wiring for a test station equipment. All of the elements of such an equipment terminate in spring jacks, thereby allowing any combination of circuits to be readily and quickly made.

battery taps to the main line telegraph circuits so as to admit of ready change in order to fit the conditions of the various connected circuits.

When current from small direct current dynamos or from the 110-volt lighting mains is used on the telegraph circuits, fuses and regulating resistances must be provided, the same as for storage batteries. This is also true of the local sounder circuits, when any of these sources of current are available. In the latter case, however, fuses and regulating

resistances are necessary in each tap to the individual circuits for safe working.

If a four-ohm sounder is used on one cell of storage battery, a non-inductive protection resistance of four ohms will limit the current in the circuit to that of best operation, twenty-five hundredths of an ampere. This protection resistance will also limit the current to one-half of an ampere in case the circuit should become crossed or short circuited.

When a main line source of current or a convenient 110-volt lighting circuit is available, a twenty-ohm sounder or one of even higher resistance can be used to advantage. The current for best operation in a twenty-ohm sounder circuit has been previously given as one-tenth of an ampere, so that the two protection resistances should be sufficiently high to give this result. For example, if current from a 110-volt lighting circuit is used, 550-ohm incandescent lamps should be inserted in the two leads, thereby giving 1,100 ohms external resistance and limiting the flow of current one-tenth of an ampere.

If the connected telegraph circuit is very long it is sometime advisable to have two sources of direct current, one at each end of the line, the two being connected in series so that one will act as a booster to the other. In extremely long circuits, it becomes necessary to install repeaters at intermediate points thereby insuring positive signals by dividing the line into comparatively short sections, each with its main line battery.

Figure 38 illustrates what is known as a toll test station equipment which is a very convenient arrangement of wiring the toll lines at a long distance office so that any combination of the same can be quickly connected and the proper apparatus inserted for a telegraph circuit, without interfering with the regular telephone service. This equipment also allows the lines to be readily opened for testing purposes.

It will be seen that a test station equipment makes it possible to establish a telegraph connection between two different points through many different toll line routes so that a good through circuit can be assured at all times, regardless of any local line troubles. The fact that the toll lines must always be kept in the best of condition for speech transmission purposes renders them especially reliable for telegraphic purposes, and, therefore, readily leased for newspaper and broker use in preference to the regular telegraph lines.

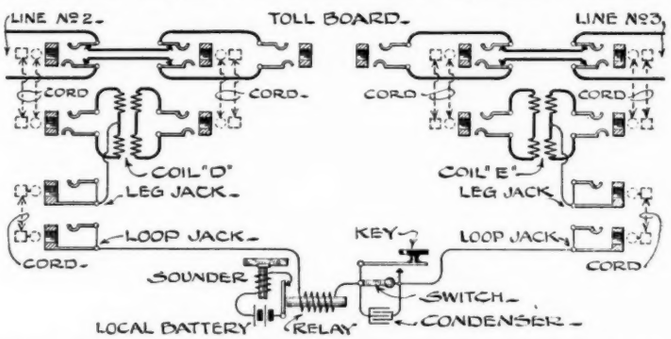


Figure 39. Test station connections for intermediate telegraph circuit such as shown in exchange Number 3, Figure 37.

Each toll line terminates at the test station, shown in Figure 38, in a cut-off jack, called the line jack, and through its platinum contacts is connected to the platinum cut-off contacts of a jack which extends the line to the switchboard, the latter jack being known as the drop jack.

A sufficient number of repeating coils are provided at the test station to allow any combination of terminal or through telegraphic connections to be made with the toll lines. Each of these coils terminate in three jacks, two of which are of the two-conductor variety and serve as connections for each half of the coil winding, while the third is a single conductor jack and is tapped off the middle of one of these windings. The first two jacks are known as the line coil jack and drop coil jack respectively, and the third jack, connected to the middle point of the repeating coil winding, is known as the leg jack.

Battery and ground jacks are also provided for convenience in building up the telegraph circuits. For example, if the terminal telegraph circuit shown at exchange Number 4 in Figure 37 is to be built up with this test station equipment, the double plug-ended two-conductor cords, *A* and *B*, Figure 38, would be inserted in the jacks as illustrated by the dotted lines, thereby connecting the repeating coil into the toll line circuit without interfering with its use for telephonic purposes. Now the leg jack of this coil is connected to a terminal jack of a telegraph circuit by a double-ended single-conductor connecting rod *C*, and by means of a similar cord, *D*, the remaining jack of the telegraph set is connected with the main line telegraph battery and to ground. If no main line battery is necessary at this station, the connection can be made from the leg jack to the loop jack and from the other loop jack directly to ground through the ground jack. Also if the station is an intermediate one, as at exchange Number 3, Figure 37, no battery or ground is necessary and the telegraph set is connected in series between the leg jacks of the two inserted repeating coils *D* and *E* as illustrated in Figure 39.

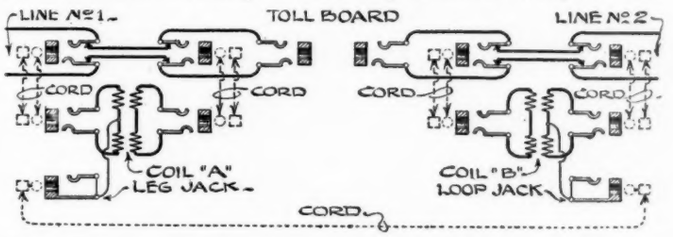


Figure 40. Test station connection for a through circuit at an intermediate point in a simplex circuit such as illustrated at exhange Number 2, Figure 37.

When the telegraphic circuit is set up for a thorough connection by means of this test set equipment, the intermediate exchanges have their toll lines directly connected as in a case of exchange Number 2, Figure 37, by inserting repeating coils *A* and *B* in the line and connecting the two leg jacks by a single conductor cord as illustrated in Figure 40.

When the exchange has but a few toll lines all of these test station jacks and repeating coils can be conveniently mounted in a small wall cabinet, but in the case of an important switching point or larger terminal station, this equipment takes on elaborate proportions and is housed in a large upright cabinet together with a complete set of wire chiefs' testing instruments. In any event, a testing bridge or other testing instrument can be readily connected to the toll line circuit, clear from all local connected equipment, by inserting a two-conductor plug into the line jack of the test station circuit.

Simplified as well as more elaborate arrangements of test station circuits are used in connection with simplex circuits but in every case the results to be secured are a flexible arrangement of apparatus and a convenient and reliable means for opening the toll lines for testing purposes and for inserting the telegraph circuit equipment.

According to official returns, the total capital cost of the telephone exchange system throughout the commonwealth of Australia is about $7,000,000. In 1905 the revenue was $1,500,000 and the expenses $850,000, leaving a balance of $650,000 to cover interest and depreciation. It is expected that $250,000 per annum will be expended during the next five years on new instruments and switchboards in Melbourne, in connection with the adoption of the measured rate. An entirely new common battery exchange is to be installed in Melbourne, with a capacity of 10,000 lines.

DIGEST OF TELEPHONE PATENTS

By Edward E. Clement

836,202. Telephone Receiver Switch; McMahon. Switch springs are located between the legs of the permanent magnet and a part of the receiver casing is hinged and forms an operating lever. Patent unassigned.

836,204. Telephone System; Parker. A ground is provided at each substation and a signaling device is associated with the line at the central station so that it operates over the metallic circuit of the line when no connection is made with the line thus giving a signal for connection, and over a grounded return when connection is made with the line thus giving the signal for disconnection. The substations have local batteries. Patent unassigned.

836,407. Telephone Attachment; Silverman. A vertical rod is attached to the casing of the telephone and has pivoted thereto an arm which in its depressed position holds the switch hook down and in its elevated positions allows the switch hooks to rise. Both positions are made positive by a spiral spring connected to the arm off the pivotal center. Patent unassigned.

836,489. Testing System for Telephone Lines; Dean. The tip strand of the cord circuit has a testing device normally connected therewith and when testing a switch is operated to open the strand in the rear of the connection of said testing device so as to put the operator's telephone set in condition to receive test impulses. Patent assigned to the Kellogg Switchboard & Supply Company.

836,514. Telephone Cord Circuit; Libby. A shunt around the generator is closed by the relay mechanism so that the generator current does not affect the relay mechanism. Each relay has a winding of 100 ohms resistance and another winding of approximately 100 ohms resistance, both connected in series for magneto work and for common battery work to be connected on either side of the battery thereby making only 100 ohms resistance or the usual amount of resistance on either side of the battery through which to feed the talking current. Patent assigned to Kellogg Switchboard & Supply Company.

836,581. Means for Eliminating or Reducing the Influence of Disturbing Currents on Telephone Circuits; Jacobs. The receiver of this system has a phonopore winding and an inductive resistance is placed in a shunt around the receiver. Patent unassigned.

836,611. Regulating Device for Telephone Relays and Transmitters; Shreeve. The carbon button in the transmitter has a thermostatic regulating device connected in series therewith so as to effect such an expansion and contraction as will rearrange the carbon granules automatically. Patent assigned to American Telephone & Telegraph Company.

836,612. Regulating Device for Telephone Relays and Transmitters; Shreeve. The local circuit of the transmitter includes a magnet, a condenser, and an impedance coil. The magnet is inserted adjacent an armature carried by the movable wall of the carbon button so that any actuation thereof will assist in preventing any packing of the carbon granules. Patent assigned to American Telephone & Telegraph Company.

Reissue 12,560. Telephone Exchange System; Davis. The line conductors are utilized for the line relays. The plug serving to include these conductors inserted with the line relays upon their insertion in the spring jack. The battery employed for the line indicators is also used in the operation of the relays. Patent assigned to Stromberg-Carlson Telephone Manufacturing Company.

Reissue 12,565. Semi-Automatic Telephone Exchange System; Thomson. A plurality of indicators or sets of indicators are included in the circuit passing through the plug circuits and are actuated by inserting the calling subscriber's plug into the jack. By removing the plug the indicators are cut out of the circuit. Patent unassigned.

836,668. Operator's Key; Carliss. This is a ringing and listening key having the rollers mounted upon an arc shaped member and the contact springs positioned oppositely with the listening spring so formed that it locks the key against retrograde movement until operated. Patent assigned to American Electric Telephone Company.

836,674. Sound Sensitizer; Frank. A pad is made of feathers or other similar or suitable material and is held over the receiver by a skirt which may be attached to the receiver by a string. The inventor claims that the pad of feathers cuts out extraneous noises and makes the transmission clearer. Patent unassigned.

836,848. Telephone Apparatus; Wilson. An induction carries the main diaphragm of the telephone receiver opposite the pole pieces thereof. The induction coil forms the basic element and operates the diaphragm of the receiver. Patent assigned to Geo. W. Kretsinger, Chicago, Ill.

836,904. Automatic System of Intercommunication; Van Wagenen. In this system non-inductive resistances are utilized to cause the calling transmitter at each substation to work a switch corresponding only to the calling station and to prevent it from operating other switches of stations on the same line. Patent unassigned.

837,097. Electric Alarm; Morrer. An alarm circuit is bridged across a telephone circuit and is provided with window operated and thermally operated circuit closers which complete the circuit or break it to control an alarm which notifies central of the fire or burglary. Patent unassigned.

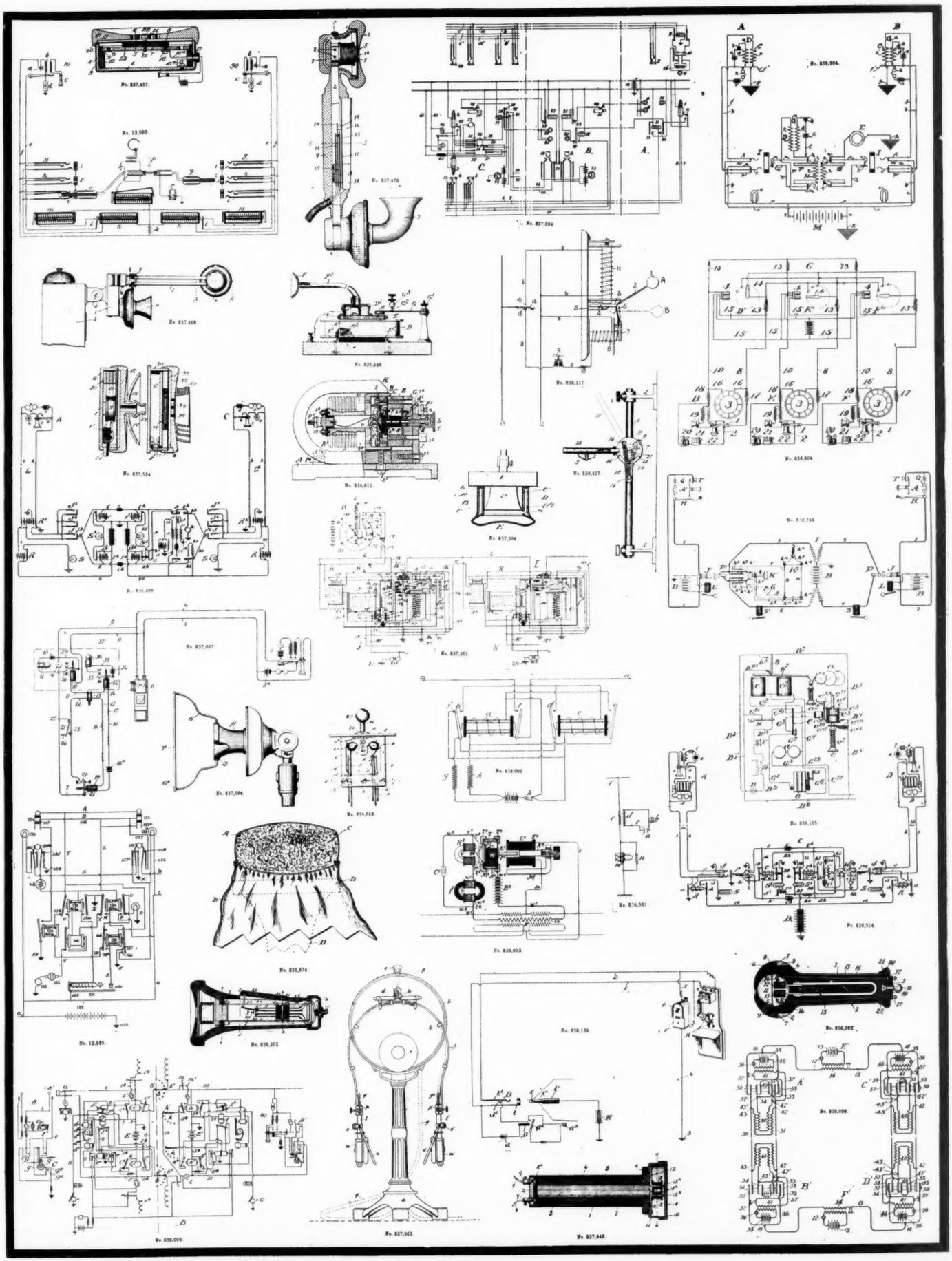
837,251. Telephone Apparatus; Roberts. The substations in this system are provided with selector instruments having a primary magnet and a holding magnet. One limb of the line extends from central to the first station selector and to ground. Extensions of this limb go to the different selectors of stations along the line. The other limb of the line is open at each substation. The disconnected sections are united by means of relays so that all other substations whose relays do not operate are locked out. Patent unassigned.

837,304. Attachment for Mouthpieces of Telephone Transmitters; Kitchell. Two concentric tubes forming an air space between them and provided with a supplemental mouthpiece are carried over the mouthpiece of the transmitter so that parties using the telephone will not have their conversation overheard by outsiders. Patent unassigned.

837,440. Receiving Device for Bond Detectors; Watson. A forked tube with contacts mounted in each and is adapted to bridge the ends of railroad rails and a receiver is connected to the wires which pass up through the tube from the contact. The receiver carries an induction coil and the contacts carried by the tube form terminals of the primary thereof. Patent unassigned.

837,457. Telephone Transmitter; Fahrenfeld. The electrodes of the carbon button are supported directly upon the diaphragm and the bridge respectively and are both corrugated so as to present points toward each other. Patent assigned to The Simplex Telephone Equipment Company.

837,469. Telephone Receiver; Houghton. The perma-



nent magnet of the receiver projects from the casing and forms a support therefor which is secured to the transmitter so that it may be turned to either side thereof for use with the right or left ear. Patent assigned to the Wire & Telephone Company of America.

837,470. Hand Telephone; Houghton & Potter. The permanent magnet of the receiver forms the supporting member for the transmitter and a switch is located between the legs thereof and is operated by a hinged section of the handle surrounding the magnet. Patent assigned to the Wire & Telephone Company of America.

837,503. Telephone; Port. An ear suspension apparatus is provided with two receivers and is made adjustable upon a tubular stem with the receivers connected to each other by an U shaped holder adjustably connected to the stem. Each tubular stem forms a passage for the conducting wires. Patent unassigned.

837,534. Telephone Apparatus; Babcock. The receiver in this apparatus has a spring clamp secured around it with extension arms adapted to clamp the transmitter therebetween. A switch carried in the receiver casing is operated when the transmitter is inserted therein so as to break the circuit. Patent assigned to the Simplex Telephone Equipment Company.

837,594. Telephone Mouthpiece Safety Guard; Sempel. A wire guard is secured to the mouthpiece of the transmitter so as to adjustably regulate the distance the user's mouth should be from the transmitter mouthpiece. Patent unassigned.

837,894. Telephone System; Aven. In this system a third board is used between the annunciator and the multiple connecting board. The operator at the third board has only to answer the calls of the subscribers and communicate with the operator at the multiple board the number of the called subscriber and that of the trunk line employed. Signals are used to indicate whether the operators are busy or idle. Patent assigned to Deutsche Telephonwerke R. Stock & Company, G. M. B. H., of Berlin, Germany.

838,005. Electrical Circuit Interrupter; Bullard & Matthies. Two relays each having a heavy copper tube driven over its iron core and with a small wire winding wound around the copper tube are provided so that their armatures approach and recede from the pole pieces with marked sluggishness. These relays control each other and each other's circuit and are alternately energized and de-energized. One of the relays controls an external busy tone circuit so that it is throbbing in character rather than a continuous hum. Patent assigned to Western Electric Company.

838,006. Automatic Exchange Circuit; Bullard. In this system a key is provided at the substation which when operated causes ringing current to be applied directly to the trunk line to operate a signal at the manual exchange so that an automatic subscriber may get in conversation with the operator at the manual exchange to make a complaint or for other purposes. Patent assigned to Western Electric Company.

838,028. Phantom Telephone System; Jordan. Phantom circuits are connected with the main circuits at points of approximately equal potential and inductive devices are connected in local circuits for causing silence in the receivers thereof whereby cross conversations and disturbances between the main circuits and phantom circuits are eliminated. Patent assigned to E. H. Carry of Dallas, Texas.

838,115. Telephone Meter; Holland. The circuits of this device are so arranged that the calling subscriber is assured of proper connection before his meter has been operated. The operation of the meter, however, is necessary before the conversation can be carried on with the other party, but the called subscriber's meter can be prevented from operating by a device which opens the circuit of the operating magnet. Patent assigned one-half to Chas. Bate.

838,117. Telephone Signal; Jordan. In this device a weighted signal lever is controlled by a magnet in the ringer circuit so that when a subscriber is called and has two telephones in his office he knows immediately by the position of the signal which line he is called upon. The device is restored to normal by a magnet whose circuit is closed when the receiver is removed from the hook. Patent assigned two-thirds to Geo. A. Carden, Dallas, Texas.

838,136. Combined Telephone and District Messenger System; Nolen. A call box is bridged across the line and has a ground tap so that either the subscriber may signal to central or central may signal the subscriber to indicate that the call has been answered. The signal in the alarm box is so constructed as to be irresponsive to telephone currents. Patent assigned one-half to Frank B. Cook.

838,244. Automatic Ringing Device for Telephone Exchange Systems; Dean. A thermic relay is associated with the generator and the ringing key in such a way that when the ringing key is depressed and locked it remains locked until the subscriber removes his receiver from the hook. A low resistance path is then formed which heats up the thermic relay and closes the circuit of a release magnet. Patent assigned to Dean Electric Company.

838,362. Receiver for Telephones; Steinberger. The permanent magnet and the terminals of the receiver windings are all cast within the body of the receiver which is solid. The receiver has an outer casing of metal. Patent unassigned.

NEW ENGLAND CONVENTION.

The fourth convention of the Vermont and New Hampshire Independent Telephone Association will be held during the afternoon and evening of January 8, 1907, at Hotel Low parlors, Bradford, Vermont.

After the business meeting in the afternoon a number of gentlemen will be present from other states and will talk on the Independent telephone situation in different parts of the United States.

At seven o'clock a banquet will be served to the members and friends of the association. Every member is expected to invite all his telephone friends and the companies with which he is connected to be present and help to make the convention a success.

It is of very great importance that every Independent telephone company in Vermont and New Hampshire should be represented at this convention and it is likely it will be largely attended.

DEATH OF ARTHUR VAUGHAN ABBOTT.

Arthur Vaughan Abbott, one of the most widely known and prominent engineers of this country, died of pneumonia, December 1, at St. Luke's Hospital, New York, after a short illness. Mr. Abbott, who was a son of the late Benjamin Abbott, was born in New York in 1854. He had been a member of the American Institute of Mining Engineers since 1882, vice-president of the American Institute of Electrical Engineers, and chief engineer of the Chicago Telephone Company and engineer of Westinghouse, Church, Kerr & Company since 1902. He wrote several books. Among his works are "Electrical Transmission of Energy," "The Evolution of a Switchboard," "History and Use of Testing Machines," "Treatise on Fuel" and "Telephony."

Business men of Lansing, Michigan, are much wrought up over the telephone question and are discussing methods of combatting the proposed advance in rates by the Michigan State (Bell) Telephone Company. The druggists are the latest to join the objectors.

MANITOBA VOTES AGAINST MONOPOLY

The Telephone Users and Citizens Come Out in Favor of Telephone Competition

By E. M. Rothelle

THE Union of Municipalities, consisting of the chief officers of all the cities, towns and villages of Manitoba, at its annual convention last year passed strong resolutions favoring public ownership of telephones and calling upon the government by unanimous vote to pass necessary legislation making it possible to secure the result desired. The last legislature, also by unanimous vote, passed Acts 89 and 90, which gave the people of the province an opportunity to ratify or reject the proposition.

The provincial government secured the services of Mr. Francis Dagger, whose past work in the telephone field made

PROVINCIAL TELEPHONE LEGISLATION

INFORMATION FOR RATEPAYERS

1. By voting "YES," you do not necessarily give your Council power to build and operate a telephone system. Such power is to be given by the Government when it is satisfied that the municipality's plans are such as will enable it to carry on a telephone business without loss to the ratepayers; NOT BEFORE.

2. The Provincial Government before endorsing the telephone bonds, will insist that the service shall be provided at as near cost as possible, but NOT BELOW cost. Hence no ratepayer, not having a telephone, will contribute one cent towards the telephone undertaking.

3. Every person in the municipality will be free to take a telephone or not take one, as he may decide in his own interest; but the man who takes a telephone will be the only one to pay for it.

4. Before the Government's consent to a municipal system can be obtained, the municipality must have enough subscribers, at a rental sufficient to cover all expenses, interest and sinking fund. As the telephone rentals will be a lien upon the telephone subscribers' property, just as taxes are, there will be no bad debts, and can be no loss.

5. The borrowing powers conferred under the telephone legislation do not affect the borrowing powers for ordinary municipal works. In other words, your municipality, after the building of a telephone system, and the issuing of its telephone bonds, will still be able to borrow for local improvements up to the amount at present allowed under the municipal law.

6. The borrowing powers for telephone service will be at all times limited by the Government to such amounts as may be required from time to time to provide telephones and build such extensions as will produce a guaranteed revenue sufficient to pay all expenses, sinking fund, and interest on the amount of each issue of telephone bonds.

7. If 60 per cent. of the qualified ratepayers, actually voting, vote "YES," your Municipal Council MAY, AT ITS OWN OPTION, take up the consideration of establishing a municipal telephone system, and will be afforded by the Government every assistance in formulating a practicable scheme. The actual authority to proceed with the work, however, is given by the Government, not by your vote; but if you vote "NO," the Government cannot, under this legislation, give this authority, nor can it endorse your telephone bonds.

8. If you vote "YES," you make it possible to obtain for yourself a telephone service suited to your requirements, at cost.

9. If you vote "NO," you perpetuate the "BELL" telephone monopoly, and thus will be at all times in that corporation's power, in regard to rates charged and service provided.

One of the Large Posters Used During the Campaign.

him naturally desirable, to take charge of a campaign of education along non-political lines and at government expense. Mr. Dagger was to advance the interests of public ownership of telephones, and he set about systematically to secure the services of men to aid him who had large influence in telephone affairs. J. B. Ware of Grand Rapids, Michigan, was selected to act as assistant to Mr. Dagger, and the entire organization was conducted very similarly to political campaigns with which we are familiar.

Besides the office routine of letters and circulars, speakers of prominence went before the voters advocating government ownership of telephones. J. F. Demers of Levis, Quebec, spoke in French. J. B. Ware of Michigan, C. B. Cheadle of Illinois, ex-Mayor Dyke of Fort William, N. F. Wing, Michigan, and Mr. Dagger himself were on the stump during nearly all of November.

With this large array of talent, it is only natural that the Bell company would select its best men to combat the issue. Among the speakers sent out by the Canadian Bell were Louis Belcourt of Montreal and Royal Lawer of St. Boniface. On his return from Manitoba Dr. Demers paid TELEPHONY office a call and related an incident characteristic of the campaign.

On the morning of November 26th, Dr. Demers was to take a train from Winnipeg for La Broquerie, a town about sixty miles away in a southeasterly direction. He stood near the entrance of a railway coach when the Bell agents previously named took a similar position farther forward, expecting to take the same train, provided the doctor would do so. Dr. Demers had not purchased a ticket, because he did not care to have the Bell agents know where he was bound for. When the train started, all of the parties swung aboard and entered the same coach, Dr. Demers taking a seat at one side and the Bell agents immediately opposite. When the conductor called for the fares Dr. Demers requested that he be seen in private, and after a parley it was so decided. After confiding his mission to the conductor with the promise of keeping it secret, the transaction was satisfactorly terminated. At Ste. Anne Dr. Demers put on his great coat and grabbed his traveling bag, on pretence of making a hurried exit. The Bell agents proceeded to the opposite end of the car with their luggage, but all three hung about the car until it started. When Dr. Demers made an effort to grab the moving train the Bell agents did likewise, but none of the parties entered the coach, remaining on the steps and watching each other as the train gathered speed. When a speed was attained that was bordering on the danger, the doctor made every pretension that he would leap from the train, and the Bell agents were so busy doing the same thing that they quite forgot the possibility of pretext. They were firmly of the belief that there was no pretension in Dr. Demers' acts, and when they saw over their shoulders a glimpse of the final swing they instantaneously took the leap. They were thrown end over end into the snow as the coach carrying the doctor whirled past. It is needless to say that Dr. Demers gave the Bell agents the merry ha-ha as his coach passed his luckless consorts.

It is twenty-six miles from Ste. Anne to La Broquerie and the country was covered with snow. The Bell agents had no knowledge in their sad plight just where Dr. Demers was billed to speak, and not having access to another train, were obliged to go overland in the direction he had taken in their efforts to intercept his meetings for that day.

Dr. Demers enumerated a great many other laughable incidents and reported that it was a campaign of strategy from start to finish. The publications in the province did not attempt to translate the doctor's speeches, but he occupied the platform on an average of twice a day for ten consecutive days, explaining in detail his connection with the work of various systems in the province of Quebec. He said that conditions for commencing municipally owned telephone systems in Quebec at that time were far inferior to what

Manitoba had to offer. In the former case, every enterprise had to be undertaken with lack of funds and lack of confidence among the people, who pretended to know very little about the telephone business. He pointed out the large success that had been made in his province in the face of all difficulties, and showed where important systems were being operated in fourteen different constituencies. Dividends of 12 per cent per annum on the capital invested were not unknown quantities, and 7 per cent and 8 per cent were quite common. Rates for the farmer do not exceed twelve dollars per annum and it was emphasized that if this could be done under favorable conditions in Quebec it ought to be very easy to accomplish equally as good results in the municipalities of Manitoba where the people and the government co-operated.

Ex-Mayor Dyke proved a tower of strength in the campaign that has been brought to a successful close. He has for the past twenty-five years traveled as a preacher over the province of Manitoba and those adjoining, and is well and favorably known in every city and town. It was owing to his efforts while mayor of Fort William that that city and Port Arthur, both situated at the head of Lake Superior, established municipal telephone plants, which now have more than 1,800 telephones satisfactorily installed.

The speech-making campaign was formally opened October 26 at Maleta, in the extreme southwestern corner of the province. Meetings were held during the following week at Brandos, Minedosa, Birtle and Donathan. The meeting at Birtle was the occasion of the annual banquet of the grain growers' association, which was attended by some two hundred men and women, and which lasted until about one o'clock the following morning. In the second week was held the annual convention of the Union of Municipalities in Portage la Prairie, at which more than one hundred and fifty officers from the municipalities of the province were present, the government paying the railway expense and two days' hotel bill of two representatives from each town. Wednesday was "telephone day," and papers were read by all of the gentlemen that have been previously named, together with one by E. H. Moulton of Minneapolis. The papers occupied the entire day. In the evening the members of the Union had a very exciting and earnest discussion on the merits of the telephone acts and the government's plans, which resulted in an adjournment until the next day, before it could be finished and voted upon. The vote resulted finally, 89 to 16 favoring a strong resolution which adopted an endorsement of telephone legislation, urging all rate payers to vote "yes" on the proposition which would be submitted at the elections to be held in Winnipeg December 11, and the rest of the province December 18.

In addition to the gentlemen we have named, who entered actively into the campaign, J. H. Shoemaker of Waterloo, Ia., contributed valuable service. Mr. Wing arrived in Winnipeg November 8, and was followed about a week later by Mr. Shoemaker.

A resumé of the meetings shows that Mr. Dagger, in addition to his supervision of the entire campaign, addressed four meetings as an individual speaker, and participated with other speakers in sixteen different meetings. Ex-Mayor Dyke addressed a total of forty-five meetings, being unassisted in thirteen of them. N. F. Wing addressed forty-one meetings, holding seventeen of them without other assistance. Mr. Cheadle addressed a total of ten meetings, being alone in three of them. Mr. Ware spoke at twenty-eight meetings, being the only speaker in half of them.

The telephone campaign was conducted during a most exciting campaign for city officers, and the fact that during all of the time the country was storm-ridden with intensely cold weather prevailing, a large attendance of voters at any meeting, was not disappointing.

The result of the election in Winnipeg December 11 was 2,970 votes for and 961 votes against the public ownership of telephones. Only the rate payer having assessment of a minimum of $400 was permitted to vote, and the result is regarded as most flattering.

The campaign of education as it involved the telephone and as it was conducted in the province of Manitoba was unique, to say the least. It is safe to assert that nothing like it has ever been known since the telephone was invented. Following the convention of municipalities held at Portage la Prairie November 9th, the Winnipeg Telegram issued a four-page supplement entirely devoted to the proceedings of the convention. In this supplement are printed the addresses of ex-Mayor Dyke, Messrs. Dagger, Ware and Cheadle, besides a vast amount of statistical information.

There are one hundred and twenty-three municipalities in the province. These municipalities are made up of cities, towns, villages and rural settlements, four classes. Each rural municipality embraces from four to twelve townships.

According to the Winnipeg papers of December 19th we learn that the returns from the municipalities, including the city of Winnipeg, show that the telephone by-law has carried by a substantial majority. These returns show that 7,835 votes have been cast for the by-law and 3,622 against it. In nearly every municipality people have shown themselves in favor of municipally owned telephones. These votes naturally show, in addition to the foregoing sentiment, that the people are decidedly opposed to Bell telephone monopoly. Of twenty town and village municipalities reporting complete returns, eighteen have decided for the principal of municipally owned telephones; five by a majority vote, and thirteen by passing the by-law on the average vote of 77 per cent, and two deciding against public ownership.

We have recently pointed out that only those rate payers assessed at a minimum of $400 were entitled to vote at this election. A total of all votes that were reported in the Winnipeg papers show that the by-law has carried by sixty-three per cent of the votes cast in the province. Owing to the very severe weather and heavy snowfall the rural municipality vote is in doubt, because it will require considerable time to hear from the isolated district.

As a fitting conclusion to the splendid achievement on the part of the voters in the province we print an editorial which appeared in the Winnipeg Telegram December 19th:

The outstanding fact in the incomplete returns of the telephone plebiscite is that the public sentiment of the province is overwhelmingly in favor of a public-owned system of telephones. There have been many victories and a few, a very few, reverses.

Generally speaking, and with the notable exception of Portage la Prairie, the larger centers have declared unmistakably in favor of public ownership of telephones. The other exceptions apply to places in which peculiar conditions existed and in which the Bell Telephone Company with its political allies succeeded by special effort in recording a negative vote.

Of twenty-six municipalities definitely heard from, or about one-sixth of the total number of municipalities which had voted on the question, seventeen have declared in favor of a public-owned telephone system. Five recorded a majority of affirmative votes, but not enough to come within the conditions of the plebiscite, and only four gave a straight majority against the government's telephone policy.

The proportions revealed in this analysis give promise of a sweeping majority in favor of public ownership of telephones. The probability is that the returns received cover those places where the Bell Telephone Company has been most active and that the municipalities which were not heard from last night represent largely those districts in which the Bell Telephone Company was unable to concentrate its efforts. This is a surmise which later returns will repudiate or confirm. The central fact is that the province has committed itself to public ownership of telephones and to an extent which not only ensures the success of provincial long distance lines

but guarantees these trunk-line feeders important to the general system and to the municipalities as well.

Bell telephone apologists may endeavor to make something of the fact that isolated communities have failed to make themselves eligible to a municipal telephone system. They cannot get away from the general significance of the vote which indicates public approval of the government's telephone policy. Nearly sixty-three per cent of the vote recorded has affirmed the popular desire for a municipal telephone system and this is something of which the promoters of the public ownership campaign may well feel proud.

There is no getting away from the fact that the vote yesterday ensures a public-owned telephone system in the province and while unfortunately a few municipalities have voted themselves out of immediate participation in the benefits of a people's telephone, a large majority have declared strongly and unmistakably against telephone monopoly.

That the municipalities which have rendered negative answers on the telephone plebiscite have made a mistake there can be no doubt. The experience of those municipalities which have declared for public ownership of telephones will soon convince the minority of their error and bring them ultimately, and the Telegram believes very soon, into the advantages incidental to public control of a great utility.

While the negative votes of the few municipalities that have declared against a system of public-owned telephones are to be deplored, their motives are not subject to criticism. The worst that can be said about them is that they allowed themselves to be deceived by the misrepresentations of the Bell Telephone Company.

It was stated and restated by the Bell Telephone Company's agents that the general taxpayer would be made responsible for obligations incurred by a municipal telephone system. While this falsehood was authoritatively and officially denied from one end of the province to the other, the deception seems to have had sufficient influence to secure negative verdicts from a few isolated municipalities.

Portage la Prairie seems to be one of the municipalities which listened to this brazen deception. Brandon on the other hand gave a magnificent endorsement of municipal telephones. The vote in the city of Brandon is an impressive tribute to the popularity of the telephone policy of the Roblin government. It is also a crushing blow to the prestige of Mayor Fleming whose efforts in behalf of the Bell Telephone Company were in evidence from the beginning to the end of the fight.

The vote in Manitoba yesterday is first and foremost an expression of confidence in the telephone policy of the Roblin government. It is a rebuke, straight from the shoulder to the business and political influences, which have allied themselves with the Bell monopoly. Last but not least it is a tribute to the work of Mr. Francis Dagger, provincial telephone expert, who has so ably organized the campaign against telephone monopoly. Mr. Dagger has carried on an educative campaign which bore fruit in the returns of yesterday's polling. The results are not only a tribute to his organizing ability, but to the intelligence of the electorate which responded with such an impressive confirmation of the merits of public ownership of telephones.

THE TELEPHONE AS A MEASURING INSTRUMENT.

A good deal has been heard of late about the use of the telephone for measuring small electric currents, says the Electrical Review. In this connection it is always the telephone receiver that is implied, and its value depends upon its sensitiveness; a very small amount of energy is sufficient to produce an audible click in a sensitive instrument. For certain purposes the telephone receiver is a reliable and sensitive device. It may be used with good results for comparing electrical quantities, if the proper conditions be secured. When it is possible to arrange the measurement so as to use a null or zero method the telephone works very well. It serves here merely as a means of balancing two quantities. It will indicate by its silence a slight unbalancing one way or the other, serving to produce a sound in the receiver. For such uses it is necessary that the energy which actuates the receiver be pulsating; otherwise no sound will be produced. The earliest use of the instrument was to compare inductances and capacities, an alternating current being employed; and later it was used in an adaptation of the potentiometer, measuring electromotive forces. The circuit containing the receiver in this case was periodically opened.

But the telephone receiver is now being used to some extent in another way, the accuracy of which may be questioned. It is sought to measure by means of it small amounts of electrical energy by comparing the intensity of the sound produced in the telephone receiver with that produced by energy supplied from a second source. The latter supply is varied and the connections alternately thrown from one circuit to the other until the experimenter decides that the sounds are equal. In this use very much depends upon the judgment of the experimenter. He must determine the relative intensities of two sounds. Anyone who has done any photometric work knows how difficult it is to decide when two surfaces are equally illuminated if the color of the lights be not identically the same. Although it is possible that the eye may be somewhat more erratic than the ear, it is not probable, and unless the two sounds produced in the telephone are exactly alike in all respects, both in intensity and quality, it will be just as difficult to decide when a balance is secured as it is in the photometer. And when using the telephone there is this additional difficulty as compared with the photometer: In the latter case two things are compared which are seen simultaneously, but in the former two sounds are compared which are heard alternately.

There is also another chance of error. The sound produced in the telephone undoubtedly depends not only upon the quantity of energy passed through, but the manner of its passage; upon the form of the electric impulse; and until this phase has been tested it is a little risky to accept quantitative results when obtained by means of the telephone receiver. Under proper conditions it might give satisfaction for qualitative results, but even here there is ample opportunity for error.

CEDARMEN'S CONVENTION.

The eleventh annual convention of the Northwestern Cedarmen's Association will be held at the Spalding Hotel, Duluth, Minnesota, on Tuesday, January 8, 1907. The meeting as usual will close with a banquet, which will be tendered the visiting delegates. The association has many members in the Duluth district, but up to this time no meeting has been held north of Minneapolis. The cedarmen in Duluth and surrounding points are making every effort to make this meeting the largest in the history of the organization.

The officers of the association are: M. H. Coolidge, president; P. W. Raber, vice-president; and W. B. Thomas, treasurer. These gentlemen, with A. T. Naugle and W. T. Watkins, comprise the directors. M. O. Nelson of Minneapolis is secretary.

FIRST NEBRASKA DISTRICT MEETING.

At the meeting called for December 10 at Kearney, of the First District of the Nebraska State Telephone Association, the following members and delegates were present: W. J. Stadelman and Warren Pratt of Kearney, Joseph Carlos of Hastings, W. J. Smith of Shelton, R. E. Mattison of Lincoln and E. C. Krewson of Elmcreek. Dr. J. N. Lyman of Hastings was elected president, Fred W. Ashton of Grand Island vice-president, E. C. Krewson secretary-treasurer. Much was said regarding the toll clearing feature of the state association by Mr. Mattison, as well as on the matter of a state directory, which was endorsed.

TELEPHONE SERVICE.

"Say, Central, what's the matter? This is the rottenest service imaginable. Give me the chief operator."

"Hello! Is this the chief? Well, I've been trying to get my wife for ten minutes and can't. I'll have my telephone taken out."

Thus speaking, the irate man went home on a car and told his telephone troubles to his wife.

"Don't talk so loudly, dear," she whispered, "I muffled the bell to keep it from waking the baby."

But the little telephone girl was still hurt and nervous.

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EDITORIAL DEPARTMENT

AN IMPORTANT SERIAL.

IN THIS number TELEPHONY presents the first installment of "The Story of the States," which will describe the marvelous development of the Independent telephone movement in the various states of the Union. Illinois is treated in the initial article of the series, and it is the purpose to describe the Indiana situation in the February number. The cold facts about Independent telephony are calculated to astonish even those who are supposed to be well acquainted with its growth, but every time the story is told the wonderful strides made burst on the mind with added force, and compel one to admit that he hasn't fully comprehended the scope of the movement after all. As in all other states, the Independents of Illinois have had to defend themselves against a bitter, unrelenting warfare waged by the Bell trust, Chicago, the metropolis of the state, and containing a third of the entire population, has been the Bell stronghold and until recently the trust has had things all its own way in that city. Out on the free prairies, however, the Independents have multiplied and prospered, advancing steadily to the very borders of Chicago, until now they are storming the Bell's Illinois citadel and forcing the trust to fight on the ground it has considered exclusively its own for many years.

Not only the number of Independent telephone exchanges but their enterprising progressive spirit augurs well for the future of the movement to Illinois. Independent lines are extending in every direction throughout the state, and the Bell is realizing more keenly every day that it can no longer sleep on its arms. And Illinois is only one state in the federal sisterhood, the same spirit dominating and waxing constantly stronger the country over. That is why, wonderful as has been the history of Independent telephony, it faces still more marvelous progress. In years to come therefore the present "Story of the States" may read like a primer, for, looking forward toward new successes, the far-sighted Independent telephone man realizes that the industry is really only on the threshold of its career.

THE BELL BRANDED AS A TRUST.

THE Bell monopoly is daily finding it harder to conceal the fact that when left undisturbed it displays all the hateful qualities and instincts of a trust. It is often unpleasant for the Bell concern to have these monopolistic earmarks exposed, but they are bound to be so long as it claims the exclusive right to the telephone business in a particular community. No doubt the Bell would much prefer to enjoy such a monopoly and yet escape being branded as a trust, but the old saying, "You can't have your cake and eat it too," is as true to-day as ever. The Bell can't pursue the policy of a trust and make people believe it is a benevolent institution. There is no case on record of anybody mistaking a Bell company for a charitable enterprise.

The latest authority to designate the Bell combine correctly is John G. Carlisle, former speaker of congress and former secretary of the treasury. He was arguing against the board of estimates of New York city granting the Bell company the exclusive right to the telephone business of Greater New York, and declared that if this demand were granted it would establish a monopoly in direct violation and defiance of the state law. Mr. Carlisle's contention made such an impression on the board that it held the Bell application in abeyance until the question can be adjudicated. This action encourages the Atlantic Telephone Company in its efforts to obtain an Independent franchise in the territory now monopolized by the Bell.

In this connection Mr. H. P. Nichols, the engineer of the

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New York bureau of franchises, has made a report of his investigation into the telephone proposition, which shows that there are many advantages in the dual systems. Competition, he points out, insures lower rates in every city where an Independent company is given a chance to measure swords with the Bell. What is more, Engineer Nichols bears witness to the well-established fact that wherever the Independents operate, the public receives better telephone service, as competition puts the Bell on its mettle and compels the giving of improved facilities. The more the question is studied the more apparent becomes the fact that competition is the only restraining influence that keeps the Bell trust within bounds and at all amenable to public demands. As such it is a distinct boon to all communities that have felt the weight of the Bell yoke.

CONCERNING POLE MATERIAL.

AN interesting insight into the wonderful development of the telephone business is furnished by the yearbook of the United States Department of Agriculture which devotes a chapter to the timber needed for poles, cross arms and insulator pins. Government statisticians estimate that there are fully 800,000 miles of telephone and telegraph pole lines in operation in this country, and figuring forty poles to the mile that there are 32,000,000 in use. The figures are overwhelming, but undoubtedly wholly within the bounds of fact. Reduced to cubic feet, on a basis of 20 to a pole, there is 640,000,000 feet of timber represented in the pole lines, and this, be it remembered, does not include the material for cross arms and pins. Naturally, the idea which occurs to the government's forestry expert is "How long will the supply of poles last and what can be done to postpone the day when the timber will be exhausted?" It is a subject of vital importance to builders of telephone lines, and is treated in detail on another page of this number of TELEPHONY.

Investigation by the government, which was aided by both producers and consumers of poles, shows that while there are yet large quantities of suitable timber in various sections of the United States the day is not far distant when the supply will run short. The cedar of Wisconsin and Michigan, it is estimated, will not last much longer than 10 or 15 years at the present rate of consumption. In the southern and western states there is yet considerable pole timber, but the cost of transportation to the north and east is an item of expense that must be reckoned. And yet it is only a question of time when these sections also will be denuded of the bulk of their forests, for the world of commerce and construction moves fast these days. It is reassuring to learn that the government is making practical tests for the preserving of poles, and that the results up to date encourage the belief that chemical treatment will make the present supply go further and prolong the life of the pole. The experiments, however, have not yet entirely satisfied the bureau of forestry just which method is best adapted to accomplishing most effectively the desired result. Figuring the average life of a pole at twelve years, the statisticians argue that 2,650,000 poles, containing 53,000,000 cubic feet, are needed every year to maintain the lines now in operation. As this does not include the new lines in process of construction and the many yet to be laid out in the extension of the rapidly growing business it is evident that the question of timber supply is one that well may lead the forestry experts to take thought for the future.

RESIDENCE TELEPHONES MULTIPLY.

THE convenience of having more than one telephone instrument in the home, business office or factory is becoming more generally recognized every day. Of course, the absolute necessity of maintaining telephone exchanges in large establishments is now admitted by all, and their utility is demonstrated every working hour. The up-to-date business man would not think of getting along without a system which enables him to communicate with every branch of his concern. But now the advantage of having more than one telephone in one's residence is becoming more prominent than ever before, and the idea is sure to be adopted almost universally in the future.

In the city of Wichita, Kan., there are more than two hundred subscribers who have two telephones. Mayor Ross early saw the advantages of having more than one instrument in the home, and his example has led many others to try the experiment. The result satisfied all who adopted the plan. Nearly every subscriber for a residence telephone has experienced the inconvenience of having to walk to another floor of his home in order to answer a telephone call. Of course, the benefit of having a telephone in the house far outweighs the exertion, for one telephone is infinitely better than none at all, but with an instrument on every floor much stair-climbing and often valuable time might be saved.

In one of the smaller cities of Indiana a resident has no less than fourteen telephones in his home. No matter where he may be in the house he has but to step across a room or hall-way to reach a telephone and promptly respond to a call. He is enthusiastic in praising the convenience of having an instrument at his elbow wherever he may be, so long as he stays under his own roof-tree.

The tendency of the times is in favor of the argument, "You can't have too much of a good thing." Of course, this isn't literally true of everything, but it comes pretty near being true of the telephone. The palatial homes of the rich are not considered complete unless equipped with telephones in the halls, the library, the drawing-room and the servants' quarters. By a system of signals the party called is notified that he or she is wanted at the telephone and, by stepping to the nearest instrument, is able to speak to the person calling at once and without a long walk. Even the owners of more modest homes have discovered the advantage of two telephones in the house and warmly commend the improvement.

Usually the extra cost is small for an additional instrument. The certain effect of this growing custom will be to make business for telephone manufacturers and operators, but the greatest benefits will be derived by the teelphone users.

POOR SERVICE IN CHICAGO.

SINCE the agitation for an Independent franchise in Chicago began the telephone users of that city have been crowding to the front with bitter complaints of the wretched service furnished by the Bell company now in the field. It seems as though while there was no prospect of escape from the Bell monopoly the people were inclined to submit in silence to a service not only indifferent but shamefully slow and inadequate, but at the prospect of competition that they awoke and demanded the improvement which had long been their just due. Business men and users of residence telephones alike are pouring out their grievances against the Bell company, and the latter's officials are being kept busy explaining and promising better things in the future.

The miserable service in Chicago, it is needless to state, is due directly to the monopoly which the Bell concern has had in that city for years. So long as there was no competitor in sight the company metaphorically snapped its fingers in the faces of the complaining patrons and asked: "What are you going to do about it?" The Bell felt secure and carried out its policy of giving as little as possible for the money. And all the telephone user could do was to grit his teeth, slam the receiver back on the hook and swear loud and deep.

Chicago business men endured the miserable service until human patience was exhausted, and it was largely through

their protesting activity that the movement for an Independent franchise was started. They were charged exorbitant rates to begin with and found the service had steadily deteriorated. The Manufacturers' association went into the courts to fight for the reduced rate established by law and found the Bell there to contest every inch of the way. When the legal battle was won there was another fight to collect rebates, and so all along they found it necessary to compel the Bell by sheer force to yield every concession no matter how small. Everything had to be wrung from the octopus. It conceded nothing.

It has not been claimed that the equipment of the Chicago company is at fault. Switchboards, wires and apparatus have not been criticized, but the service and the attitude of the management towards the public have nagged the people until their dander is up. We usually are willing to make allowances for faults if they are acknowledged and a spirit to remedy conditions is shown. What makes the average American enraged is to be ignored or insulted and told to go to Jericho when he has a well-founded complaint to make. This is precisely why the Bell company has aroused the wrath of the Chicago telephone public.

The chief complaint made by Chicago business men is that the "busy" signal is resorted to much too often. Patrons have called up other concerns and been put off with the signal when investigations showed the line was idle. Blame for this is laid upon the operators, but Chicagoans go still further back and assert that the operators would not disregard the patron's rights unless there was a similar spirit among the officers of the company. That is to say, that the operators merely reflected the attitude of the Bell management toward the telephone public.

The situation has finally forced the Chicago Tribune to come out in a strong editorial condemning the overworking of the "busy" signal and warning all persons desiring to talk to the Tribune office not to be deceived by this excuse. The Tribune, like most Chicago concerns, is tired of the Bell service and has invited all business firms to send in their complaints against the telephone company so they may be investigated in connection with the negotiations now pending before the city council, which has been asked to grant a franchise to the Manufacturers' association. Having thirty separate lines the Tribune refuses to believe that the "busy" signal is often necessary, and charges that the Bell company simply refuses to attend to business and furnish the service for which it is paid.

Officials of the Chicago Bell have tried to explain the faults of the service by blaming them on the telephone users, but the public refuses to accept such excuses. The chances are that the agitation now on will compel the Chicago company to treat its patrons more considerately and furnish them with a better service.

HEROISM OF TELEPHONE GIRLS.

THE value of the telephone as an aid on occasions of emergency is demonstrated time and again in every day life, and frequently the proof of its efficiency is accompanied by a story of the bravery and unflinching fidelity to duty of the telephone operator. This is not to be wondered at, for if the telephone is to be an "ever present help in time of trouble" it is imperative that the operator must be at her post ready to perform her work speedily and well. And the ranks of the telephone girls contain genuine heroines as self-sacrificing and devoted to duty as any that ever won a Carnegie medal for an act of signal bravery. No book is large enough to record the instances of aid and relief supplied through the agency of the telephone, but some day a volume should be written in commemoration of the deeds of daring done by the "Hello" girls in the performance of their daily task.

In the little city of Hagerstown, Indiana, there is such a heroine, whose prosaic name—Hattie Cheesman—deserves a place on the roll of honor. Miss Cheesman is the night operator—if she has not since been promoted, as she deserves—of the local exchange which is situated over the bank. In the middle of the night, while the whole town was asleep, a gang of desperate robbers broke into the building in an attempt to loot the bank vaults. The operator kept her nerve and pluckily sat at her switchboard calling up every citizen who had a telephone to give warning of the raid, even while the gang was at work under her very feet. The robbers exploded seven charges of nitroglycerin in their efforts to blow open the vaults, but, although the building rocked and trembled and threatened to collapse, the brave girl stood at her post arousing the town until the sound of shots outside advised her that the citizens had acted on her timely warning. She didn't faint then, either, as might have been supposed—and pardoned for doing—but performed another wise act in calling up the neighboring towns and telling the officers of the law to watch for the robbers. Although the thieves escaped from Hagerstown with $6,000 they were apprehended in an adjoining township, thanks to the bravery and good judgment displayed by the night operator. Down in LaPlata, Georgia, a Miss Annie Mairens, another night operator, saved the town from destruction by fire by sticking to her post and arousing the citizens, although the building she was in was aflame at the time. The girl "stood on the burning deck"—and this literally—until the firemen had been routed out of bed and summoned to the rescue. In both these cases a consideration for one's safety alone would have led the operator to desert her post of duty and run no personal peril. But a sense of duty held her at the switchboard and impelled her to leave nothing undone to guard the interests of the community.

Extraordinary coolness and intelligence are displayed by telephone operators every day and it is only when some notable example is brought to notice that they are given the credit due them. Almost invariably they are found equal to any occasion. The ability of the police and fire departments and of the physician to render aid at times of stress and danger is multiplied tenfold by the faithful work of the telephone operator. Her efficiency enables them to do their work of mercy and protection, and too often the part played by the telephone and the "Hello" girl is overlooked. Not always are the operator's exploits so spectacular as those cited, but in times of emergency her duty is invariably performed unselfishly and capably. Take off your hats to the Grace Darlings of the switchboard.

CONVERTED BY TELEPHONE.

EVANGELISTS who are conducting revivals in Illinois have reached the conclusion that the telephone is destined to become a soul-saver as well as a time-saver. At the little town of Neponset revival services were held last month, and Evangelists Hicks and Galloway were confronted with the problem of reaching the farmers who lived too far from the village to attending the evening meetings. The editor of the local paper and the manager of the Empire Telephone Company put their heads together, and solved the difficulty. The religious meetings were held in the town hall, and immediately in front of the platform was placed a gigantic megaphone into which the exhorters spoke. Attached to the small end of the megaphone was a telephone wire leading to the exchange switchboard that served twenty six-party lines extending for miles into the country in every direction.

When the revival services began the subscribers to the rural lines went to their telephones and were able to hear the sermon and music nearly as well as though they had been sitting in the hall. While the meeting was in progress all other telephone service was suspended and the farmers

voted the plan a success. They were able to enjoy the revival without leaving their homes, and it is asserted that nine persons were converted to religion who were miles away from the "mourner's bench," but hearkened to the call of conscience awakened by the telephone service.

Instances of the telephone being utilized in churches in the large cities are of frequent occurrence, but so far as known this is the first case of the kind in the rural districts. It shows that the rural line subscriber is not a whit behind the city dweller in utilizing the advantages of the telephone.

GOOD TELEPHONE RULES.

A WRITER who has evidently suffered much from those who abuse the telephone, submits the following rules for the guidance of the telephone user:

1. Don't call a man to the telephone for social chat during business hours.
2. Don't waste the time of other people by talking longer than necessary.
3. Don't visit with the operator and keep others waiting. Give your number only. Anything more is an imposition on the other subscribers.
4. Don't use the office telephone for personal conversation.
5. Don't use the telephone at all unless you have something to say.
6. Don't relate gossip over the wire.

The observation of these few simple rules would greatly facilitate the work of the central and render the telephone more valuable.

TELEPHONE MANNERS.

THE telephone is no longer a new or a novel institution, and crudeness, even rudeness of manners, is no longer tolerated on the grounds of unusualness of situations, says the Memphis Commercial Appeal. The "Who is that?" of the man or woman at the other end of the line who has just called you from your occupation, not at your convenience, but at his or hers, is just too exasperating for words.

What right is there in the fellow at a distance first to call you with a harsh and jingling bell and then to greet your "hello" with a suspicious query? Why should you leave your chair, drop your work and hasten to the impatient rattle of a bell, and then patiently subject yourself to a catechism from some unknown party?

If respect for oneself does not demand resentment at the query from the unknown, common prudence ought to teach the advisability of declining to answer questions over the telephone until the party calling shall have announced his personality. Whoever heard of a visitor butting into a man's office and greeting him with the query, "Who the deuce are you, anyhow?"

The right to question is plainly in the man called upon; the duty of explanation clearly with the caller. But there are many brusque, not to say impertinent persons, who think that the tables are turned when using a telephone. They seem to think that because the exchange has connected them with your telephone you and your servants and all that are of your house are their victims, but that to them is permitted a degree of caution as to identity and freedom as to speech which would not be tolerated for a moment in personal converse.

"Ting-a-ling-ling-ling"— "Well, hello?"—"Hello, who is that?" Now, don't you feel like saying, in the most dignified manner imaginable: "Look here, sir; I didn't call you. You have caused the exchange to ring my number. Presumably you have something to say to some member of my household. Will you be considerate enough to designate who it is you wish to converse with and courteous enough to declare your identity, that I may judge as to the advisability of permitting further communication?"

But you don't use language of this sort. In the embarrassment of being asked who you are in your own quarters you either grow confused and answer the insolent question, or else you lose your temper and try to contribute to the embarrassment of the wretch at the other end of the line.

These inconsiderable interrogators have a way, too, of ringing up a residence in the night time, and without discovering their own identity, breezily inquire if the man of the family is there. For obvious reasons these queries should not be answered until the caller has disclosed himself fully.

No doubt there is the prerogative of immediate response attached to the telephone call just as there is the courtesy of immediate attention to a caller to your office, but in both instances the right of inquiry remains with the party called upon. The caller may, with perfect propriety, after your questioning hello or your look of inquiry, ask if this is Mr. So-and-So, but should he throw a brutal and suspicious "who the deuce are you?" at you he deserves to be kicked out; so the "Who is that?" from the caller at the other end to the party called ought to be rung off promptly and repeatedly enough to inculcate better manners in his use of the telephone.

THE TELEPHONE GIRL.

THE following tribute to the telephone girl is so true that we give it editorial prominence and request our readers to peruse it carefully. It is from an eastern daily paper:

A New York man was "if-you-please and yes-sired" so politely by a telephone operator that he called up the manager and said a good word for the girl. It was so very unusual, he said.

"Unusual?" responded the manager. "Certainly the operator's politeness is not more unusual than your own. I have been in this business a good many years, and you are the first man who ever took the trouble to say a good word to me for an operator. But complaints? Why, there seem to be a million women in this city who have nothing else to do."

It is no temper-soothing job—that which the telephone operator holds.

She is held responsible not only for her own mistakes, but for the thousands of mistakes made by other people.

You carelessly call for 1985 when what you really want is 1895, and because you get the wrong party you petulantly blame the "fool operator," and upon your severely informing her that she gave you 1985 when you asked for 1895, and that if she ever does it again you will make complaint against her, you feel slighted because she does not say "thank you."

You roughly jar your telephone and your nerves if she does not answer instantly; you think she is teasing you when she tells you the line you want is busy; and perhaps you more than half suspect she is listening to all you say over the line.

She is a sadly misjudged girl. Her work is difficult and her errors are marvelously few. She has no time for unnecessary words, though she is as polite as the public will permit her to be.

She knows that you never think of her service except when it goes wrong., and never speak of her except to "knock."

Yet she patiently does the best she can for you, and that is often better than you deserve.

Don't imagine you are distinguishing yourself by complaining against her. Thousands have been ahead of you. But say a word in her favor at the right place and you stand alone with an approving conscience.

PROLONGING THE LIFE OF TELEPHONE POLES

From the 1905 Year Book of the Department of Agriculture.

THE extraordinary increase in the use of the telephone and telegraph during the last few years, combined with the fast-diminishing supply of timber used in pole-line construction, has led the telephone and telegraph companies to take great interest in experiments to find the best and most practical method for increasing the length of service poles and cross-arms. Bulletin No. 17, "Telephones and Telegraphs, 1902," recently issued by the Bureau of the Census, Department of Commerce and Labor, shows that in 1902 there were approximately 422,000 miles of telephone and 238,000 miles of telegraph pole lines in operation in the United States (not including telegraph lines owned and operated by railroads). A report lately published by the Bell telephone system shows that since 1902 its subscribers' stations have increased from about 1,000,000 to 1,800,000, and all indications point to an equal if not a more rapid increase in the near future. Reports of other companies also show large growth for the last three or four years. It is, therefore, probably safe to assume that there are at the present time fully 800,000 miles of pole line in operation in the United States.

Of the timbers used for poles, chestnut and northern, southern and Idaho cedar easily rank first. Longleaf and shortleaf pine, red cedar, cypress, redwood, locust, catalpa, and several of the oaks are used, but in much smaller numbers, and their employment is generally confined to the region of their growth. Still other timbers are used, but in numbers insignificant in comparison with those mentioned above.

For cross-arms longleaf, shortleaf and loblolly pines of the south and Norway pine of the north are most largely used, while the demand for cedar, cypress, spruce, and red fir is but little less. Again, as in the case of pole timbers, a third group may be formed of those timbers used in small numbers and very locally.

Black locust is admitted to be the best of all woods used for insulator pins, but of late years, because of overcutting and damage by insects, the supply of black locust has been greatly depleted, and other woods are being brought into use. Among those which will probably prove satisfactory as substitutes for the black locust are Osage orange, various oaks, yellow birch, gum, hard maple, elm, etc.

Assuming that the 800,000 miles of pole lines are constructed on a basis of 40 poles per mile, and that each pole contains an average of 20 cubic feet, it will be seen that there are now in use 32,000,000 poles, representing 640,000,000 cubic feet of timber. If the average length of life of these poles is twelve years, there are annually needed, for the maintenance of the present lines alone, over 2,650,000 poles, containing approximately 53,00,000 cubic feet of timber; and if it requires sixty years to grow a pole, to maintain the supply there should be five poles growing for every one in use, or 160,000,000 poles for renewal merely, besides what the extension of business will call for.

Two years ago the Bureau of Forestry sent out a large number of letters requesting both producers and consumers of poles, cross-arms and insulator pins, to answer certain questions relative to the kind and supply of timbers used in various parts of the country. Replies to these questions represented a very fair expression of opinion from all the large timber-producing sections of the United States; while there was some variation in the answers to questions regarding the probable length of time the present supply would last, the consensus of opinion was that the supply of the timbers most in demand was being rapidly exhausted.

Michigan and Wisconsin lumbermen agreed that from ten to fifteen years would see all the available pole-size cedar cut out. They looked to Canada and the northwestern states to supply poles after that time. Pole producers throughout the southern states were of the opinion that the cedar would soon be cut out and that cypress and pine would take its place. It may be noted here that at the present time considerable quantities of creosoted pine are used in the gulf states, where owing to climatic conditions, not only that part near the ground line, but the whole length of untreated poles decays with great rapidity.

Throughout the chestnut regions the outlook was no better, though there are still some bodies of chestnut in the more inaccessible parts of the southern Appalachians.

There is a large supply of pole timber in the western states, but the heavy freight rate on shipments of poles to the east, where by far the greatest mileage is built and maintained, has precluded the possibility of making much use of this supply.

At present there is no great cause for alarm over the cross-arm situation, for there are still considerable available supplies of the timbers used in their construction. The price is advancing, however, and it is very probable that this fact will lead to increased energy on the part of the consumers to find better methods for preserving the arms against decay.

In the case of insulator pins, however, the outlook is not so encouraging. The supply of black locust—the wood almost exclusively used in their manufacture—is practically exhausted, and up to the present time no general effort has been made to find a suitable substitute. The result of this lack of foresight is that experiments which must extend over a number of years have only now been begun, to determine which, among the several woods that suggest themselves, possess the requisite qualities.

Such, then, is the situation confronting pole-line companies—a rapidly increasing business, demanding timber for poles, cross-arms, and insulator pins, and a far more rapidly decreasing supply of the timbers now in use.

Here, as in the very similar problem of railroad-tie supply, the use of measures to lessen the effects of decay promises substantial relief. This relief is likely to be felt in two ways. Preservative treatment will doubtless add new species to those now in use, and will thus augment the supply. It will also make the present supply go farther, by lengthening the term of service. Experiments to determine the comparative merits of different treatments to lengthen the life of poles have been undertaken by the Forest Service, and the general plan of these experiments will be described in the present article. Although sufficient time has not yet passed to disclose the conclusions which the experiments will yield, it will be seen that when completed they should furnish a conclusive test of the commercial practicability of specific methods of treatment.

That a treatment shall be cheap and that it shall at the same time materially prolong the life of poles is essential to its commercial adoption. The Forest Service experiments were, therefore, confined to those methods which were cheap and which promised in some measure to prove satisfactory.

The method of treatment commonly employed with other timbers involves treatment of the whole pole in an air-tight cylinder permitting the application of pressure, and is therefore expensive. For this reason it was not considered. For the larger part of the country the portion of the pole above the ground does not readily decay, so that treatment of the entire pole is not necessary. In those sections of the country where the climatic conditions make it desirable, the treatment of the entire pole has given excellent satisfaction.

The investigations were confined to the consideration of various methods for protecting that part of the pole most subject to decay, i. e., the part immediately above and immediately below the ground line. Of these methods, the two referred to later as the first and the third methods of treatment were the only ones used to any extent. Either of these methods is likely to pay well. The cost of a green pole at the setting hole may be put at $5, and of a treated pole (calculated on the basis of fair prices for labor and a good preservative) at $5.40 and $5.65, respectively, for brush-treated and tank-treated poles. The average length of life of a green pole is about twelve years, and an increase in length of service due to treatment of four years in the case of poles treated by the first or brush method, and eight years in the case of poles treated by the third or tank method, is probably a very conservative assumption. Calculating the annual charge on an expenditure occurring now and recurring regularly, we find that with interest at 4 per cent the annual charge for a green pole is $0.5328, for a pole treated by the first method $0.4634, and for a pole treated by the third method $0.4157. A comparison of these annual charges shows that by using a pole treated by the first method instead of a green pole an annual saving of about 7 cents is effected, while of a pole treated by the third method is used the annual saving will be about 12 cents. The difference between the annual charges for poles treated by the first and by the third method is 4 cents.

These small savings may seem insignificant in themselves, but if we apply them to the 32,000,000 poles in use we have the following figures as the annual saving by using treated poles instead of green poles:

By the first method.....$2,240,000
By the third method..... 3,840,000

These savings represent the value at the setting hole of 415,000 poles if treated by the first method and 678,000 poles if treated by the third method.

The first or brush treatment can be applied at any place and to practically any number of poles without affecting the cost of treatment in any appreciable amount, for the apparatus needed for this treatment is simple and is easily hauled from one point to another. The third or tank method could be most economically applied at concentrating yards, where a large number of poles are kept on hand. In such yards permanent tanks could be constructed and various labor-saving devices for handling poles, not practicable where the apparatus had to be moved from one point to another, could be installed. For treating small numbers of poles at separate points, portable tanks could be constructed at comparatively small cost. The size and elaborateness of the tanks and other apparatus will depend upon the number of poles to be treated and the permanence of the treating yard, and the larger the number of poles to be treated the smaller will be the cost per pole.

Seasoning.—In August, 1902, the Forest Service entered into co-operation with the American Telephone and Telegraph Company, and later on—in 1904—with the Postal Telegraph-Cable Company. The main purpose of this co-operation was to determine which of several methods of applying preservative treatment is most practical. A careful preliminary study was made of such points as the effect upon the length of service of seasonal cutting and of soaking in water, and the time required for seasoning the timber to an air-dry condition. Several stations were established in New Jersey, Pennsylvania, Michigan and North Carolina, at each of which fifty poles were cut at monthly intervals for one year. Poles were weighed as soon as cut, and then placed on skids about two feet above the ground to season. These poles were weighed again at monthly intervals until they ceased to lose weight, indicating that they had reached an air-dry condition.

The results of these preliminary or seasoning experiments have established many important facts regarding the seasoning of timber, and have suggested new lines of work which, it is hoped, will result in largely increasing our knowledge of the subject. It was shown, for example, that though poles cut in the spring and summer lose weight more rapidly during the first three or four months than those cut in the winter, the latter dry more regularly and at the end of six months are better seasoned. Soaking in water for from two to four weeks was found to hasten materially the rate of subsequent seasoning. The degree of shrinkage which takes place during air seasoning was also investigated. It was shown that contrary to a somewhat common opinion among users of poles, the considerable shrinkage which is known to take place when wood is thoroughly dried by the application of artificial heat does not appear in the case of telephone poles dried out of doors, the decrease in the circumference amounting to little more than one-half of one per cent.

Treatment of Poles.—When poles at the several stations had reached an air-dry condition, they were ready to receive treatment. Several different kinds of preservatives were applied by one or more of three distinct methods.

The first method consisted of applying from one to three coats of preservative to the outside of that part of the pole between two feet and eight feet from the butt. The time between applications varied from a few hours to two days, according to the directions given by the manufacturers of the preservatives. Careful notes were made of the condition of the poles as regards seasoning, checks, knot holes, etc. The temperature and weight of the preservative were recorded before and after each treatment, and the amount of preservative absorbed by each pole was accurately determined. In addition, holes were bored into the poles in different parts of the treated portion, and a close examination was made to determine the depth to which the preservative had penetrated.

The second method of treatment consisted of forcing the preservatives into the butt of the pole by means of a steel cap fitted to the butt and connected by a pipe with a hand-pump, while another pipe led from the pump to a large pot in which the preservative was heated. But little difficulty was experienced in forcing the preservative for several feet into the solid portions of the pole, but owing to the presence of seasoning checks the penetration was not uniform, and when high pressure was applied the preservative spurted from these checks with considerable force. Numerous preliminary trials with this apparatus having proved the practical impossibility of obtaining a uniform penetration, none of the poles treated by this method was afterwards set in the experimental lines.

The third method consisted of soaking the butts of the poles in tanks so constructed that the poles lay at an angle of about 20 degrees. The butts of the poles were immersed for a distance of about eight feet in a tank containing cold preservative, which was gradually heated by a fire underneath the tank until a temperature of from 240 degrees to 270 degrees F. was reached. This temperature was maintained for about five hours, when the fires were drawn. The poles were left in the tank for several hours after the preservative had become cold, so that the entire treatment consumed about 24 hours. By this method a penetration of about one-half an inch was obtained.

The first treatments were begun at Wilmington, N. C.,

in April, 1905, where white cedar poles that had been seasoning for about two years were treated with seven different preservatives. The second series of treatments was made at Hominy, N. C., where seasoned chestnut poles were used. The third series of treatments was made at Mount Arlington, N. J., where chestnut poles that had seasoned for three years were used. The tank method of treatment was tried for the first time at this station. The fourth and last series of treatments was made at Thorndale and Paoli, Pa., where seasoned chestnut poles were used. The treatments at this station were practically the same as those at Mount Arlington.

Setting the Experimental Poles.—To test the effects of the different preservatives 300 seasoned 30-foot cedar poles from Wilmington and an equal number of chestnut poles from Hominy, N. C., some of them treated and some untreated, were shipped to Savannah and nearby stations in Georgia, to be set in the standard Savannah, Abbeville and Eastman toll line of the Southern Bell Telephone and Telegraph Company, together with green poles cut in the immediate vicinity of the line. This section of the country was selected primarily because of the rapidity with which timber there decays, thus insuring the obtaining of results in the shortest possible time. Several years, however, must necessarily elapse before definite conclusions can be drawn from the experiment.

The poles were set in 24 series, 34 poles in each, and were so arranged that in every case a treated pole stands between a green and a seasoned pole. In this manner soil conditions were obtained as nearly identical as is possible in pole-line building, and the data secured will afford an excellent basis for comparison when determining the relative merits of the various preservatives and of the seasoned poles on the basis of the life of a green pole. Exact descriptions of the character, composition and depth of the soil and subsoil, and general notes of the immediate locality and of the equipment of the line, were made for each pole.

A second experimental test was undertaken near Warren, Pa., by setting 600 chestnut poles from Thorndale and Paoli, Pa., and 368 chestnut poles from Mount Arlington, N. J., in the Warren and Buffalo line of the American Telephone and Telegraph Company. The plan followed was similar to that used on the Savannah, Abbeville and Eastman line. The Warren and Buffalo line runs through a varied country, and all types of locality, from high, rocky ridges to low, murky swamps are represented in the sixty miles throughout which the experimental line extends.

Several experiments have at various times been undertaken by telephone and telegraph companies with a view to solving the problem of treating poles in a cheap but thorough manner. From one cause or another, however, they have either failed entirely or the records are so incomplete as to render them practically valueless. The experiments now being carried on are of importance, therefore, in that they will add very considerable and definite knowledge to our none too extensive understanding of the seasoning and preserving of timber.

DECISIONS AFFECTING TELEPHONY

By Gilbert W. Hand

RIGHT OF COMPETING COMPANY TO QUESTION AUTHORITY OF ANOTHER TO USE STREETS AND HIGHWAYS.

AN INSTRUCTIVE case directly in point on the above question has been decided by the court of appeals of Kentucky, and owing to its interest to the Independent telephone companies of the country a considerable portion of the opinion will be set forth verbatim. The facts were that the Merchants' Police & District Telegraph Company, the owner of a franchise to operate a telephone plant in the city of Covington, had begun suit to enjoin the Citizens' Telephone Company from operating a telephone plant in that city. The contention on which the former company asked for this order was that the latter had no authority to do business as provided by section 164 of the constitution of the state. This section provides: "Before granting such franchise or privilege for a term of years, such municipality shall first after due advertisement receive bids therefor publicly," etc. It was conceded that the former company had complied with all the requirements of law to authorize it to do business in the city; it was also shown that the latter company had no right other than a permissive right received by the city council for an indefinite length of time. It did not claim its right to operate by reason of the purchase of a franchise as provided by the aforesaid constitutional provision. The latter company defendant on the ground that the Merchants' company could not maintain the action since its rights were not exclusive under the law and that it did not show any special injury by the acts of the defendant.

The court discussed the questions presented as follows: First, "Did the Citizens' company obtain a legal franchise to operate a telephone line in the city by the ordinance making an indefinite grant to it for that purpose? . . . Second, If not has the Merchants' company the right to maintain this action to prevent it from exercising this illegal right?" . . . The court then quoted the section of the constitution above set forth, saying: "this section became operative upon the adoption of the constitution. It did not require an ordinance of the general council to make it binding and obligatory. Therefore any effort or act of the council in granting a franchise or privilege contract to this section of the constitution is absolutely void, and conferred no right whatever upon the party securing the grant. . . . We will now consider the grant under which the Citizens' company is operating. It is conceded that the ordinance making the grant was enacted in 1895, more than ten years since. Its right to operate under the franchise was without right or limit, except as the city council gave the authority. This is a clear attempt to avoid the privileges of the constitution. . . . In our opinion the latter company is operating its telephone without authority. The second question is more difficult. The defendant company conceded, that if the other owned or had purchased the exclusive right to operate a telephone line in the city, and the former grant is void, then the Merchants' company could maintain this action to prevent its interference with this exclusive right; but as the Merchants' company does not own the exclusive privilege, it has no right to prosecute this action." The court refused to pass upon the question suggested by the contention as presented by the defendant company, but held as follows: "it is conceded that the plaintiff is a citizen and taxpayer of Covington, and in our opinion as such it should have the right to prevent the further continuance of the wrong perpetuated by the council of that city, in granting illegally the franchise to defendant, by stopping it from the further exercise of its pretended rights under it. The plaintiff is interested as other citizens in saving the city from loss . . . of a valuable franchise . . ." It will be

noted that both points were decided against the Citizens Telephone Company.

Merchants' Police and District Telegraph Company v. Citizens' Telephone Company, 93 S. W. 642.

INJURY FROM GUY WIRE BEING PLACED TOO NEAR ALLEY.

In another Kentucky case the facts disclosed that the Louisville Home Telephone Company had a guy wire strung in a certain alley only a short distance inside the side line of the alley, but near enough to obstruct a passing vehicle on that side of the passageway. Plaintiff, John D. Gasper, was walking in the alley and when adjacent to the guy wire in question on the opposite side of the alley was severely injured by being crushed under a heavy wagon which was overturned on him by being caught on the wire. There was negligence alleged against the company in maintaining the wire so near the roadway in the alley and also negligence against the driver of the vehicle. The court of appeals said that if the company was in fact negligent that the intervening act of the driver of the vehicle would not excuse it from liability. A judgment obtained in the lower court for $2,000 was accordingly affirmed.

Louisville Home Telephone Company v. Gasper, 93 S. W. 1057.

AUTHORITY OF ONE OWNING TELEPHONE LINE TO CONNECT WITH ANOTHER IN WHICH HE HAS MERELY AN INTEREST WIHOUT LATTER'S CONSENT.

A case setting forth the law on the question above presented has recently been decided by the Missouri courts. The facts were that the Western Union Telegraph Company owned or had the controlling interest in a certain telephone line from the town of Omaha to Unionville. C. J. Ulrich owned a certain line connecting the town of Omaha with the town of Chapel and claimed that he had been a contributor to and had an interest in the line from Omaha to Unionville. He insisted that he had authority to connect his line with the Unionville line, thus giving the people at Chapel connecton with the county seat at Unionville. Mr. Ulrich at various times connected his line with the Unionville line and as often the connection was severed by the company. Finally the latter asked for an injunction to restrain Ulrich from further persisting in the acts here referred to. The Kansas City court of appeals in deciding the case said: "Admitting that the defendant had an interest in the Unionville line, he had no right to attach the Chapel line to the same, as it was under the control of the plaintiff. Therefore, it is plain that when he made such connection and the same was removed by the plaintiff, that he was persisting in his unlawful act—in other words, continuing it. The defendant sought by the strength of his own hands to enforce his supposed or actual right to free communication over plaintiff's line. This, the law does not permit. He was required to enforce whatever right he had in a peaceable manner." An order was entered restraining the defendant from further continuing the course pursued by him.

Western Union Telegraph Company v. Ulrich, 97 S. W. 192.

PRESENCE OF POLES AND WIRES ON LAND NOTICE TO BUYER THAT OWNER OF THEM HAS RIGHT TO USE THE PROPERTY.

One Denton purchased certain real estate in the county of Henderson, Kentucky, at a "decretal" sale. At the time the Cumberland Telephone & Telegraph Company had erected thereon a line of telephone poles and wires. Denton alleged in asking for an order to compel the company to remove the poles and wires that when he purchased the property there was no record in the office of the register of deeds of any right of the company to place the poles on the land in question. The company demurred to the petition, contending that the fact that the poles and wires were in fact on the land when Denton bought it was notice to the latter that the company had some right of occupancy; that the presumption of occupancy is that the occupant does so under legal right. Denton did not allege that the company was wrongfully in possession or that it entered on the land without right. The court said that to invest the owner of the poles with the right of use of the land, it was not necessary that the instrument conveying this authority should be recorded and accordingly sustained the ruling of the lower court dismissing the petition for the order above referred to. It was also remarked that if the company was wrongfully in possession this matter could be decided in another and proper proceeding.

Denton v. Cumberland Telephone & Telegraph Company, 96 S. W. 1112.

TELEPHONE CONVERSATIONS AS EVIDENCE—HEARSAY RULE APPLIES.

In an assumpsit action in the Michigan courts a circuit judge had permitted the following testimony to be given: Plaintiff had testified that a certain station agent had told him that defendant had said certain things over the telephone relative to the alleged contract; that he requested the station agent to call up defendant and ask him if plaintiff should haul the goods for him, "So he called him up and then came to where I was unloading and said Ferwerda (defendant) wanted me to take the load up there, so I did." The supreme court of the state has said that this testimony was not admissible and was merely hearsay; that the testimony of the station agent relative to the alleged conversation would have been proper had he instead of plaintiff been called to relate the statements. The courts of this state recognize the admissibility of telephone conversations in evidence but restrict their admission to the established rules of evidence. It is plain that plaintiff's statements above referred to were clearly within the hearsay rule and it is not easy to discern how the ruling of the lower court could have been made in view of this fact.

Duvall v. Ferwerda, 13 D. L. N. (Mich.) 659.

TAXATION—TELEPHONE EASEMENTS IN TUNNELS HELD TO BE ASSESSABLE AS REAL ESTATE.

The revised statutes of Illinois (1903) declare that in tangible property of corporations similar to telegraph and telephone companies shall be assessed by the state board of equalization, and that tangible property including real and personal property of such corporations shall be assessed by the board of local assessors. The statute defines personal property for the purpose of taxation as not only the land itself with things contained therein, but also all permanent fixtures of whatsoever kind and all rights and privileges belonging or in any way pertaining thereto, except as otherwise defined in the act. In a case decided during this year it has been held that the rights of certain telephone, telegraph and tunnel companies to use tunnels constructed by them in the streets of Chicago as conduits by virtue of the act of the city authorizing the maintenance of them for thirty years, were assessable for taxation against such companies as real estate and not as intangible property.

People v. Upham, 77 N. E. 931.

The Commercial Telephone Company of Warsaw, Indiana, has purchased the Missionary block, in which it occupies four up-stairs rooms with its offices and exchange. The building is two stories. The company is adding 200 lines to its multiple switchboard and 500 multiple jacks in sections already in service. Also an addition to its main rack to accommodate 600 cable pair. It is adding 200 lines to its present board and having multiple cables put in and fanned out for the full capacity of the board, which is 1,200 lines.

THE RELATION OF RURAL TELEPHONES TO TOWNS AND CITIES

Abstract of a Paper Read before the Union of Canadian Municipalities at Halifax.

By A. F. Wilson

THE policy of the Bell companies, under whatever name known, apparently has been, and from the very nature of a centralized corporate organization must continue to be, to endeavor to control a sphere of action beyond the operation of a single management. It will always be to develop the most profitable business, namely, long-distance traffic, and the large centers which yield high rentals and are susceptible to centralized management and operation. The origin and policy of the Independent—that is, the non-Bell—telephone systems are exactly the reverse of the Bell system. It is a people's movement, in the truest sense, causing and propelling a social revolution in farm life and business and in home life in urban residences. The Bell policy is the quintessence of commercialism; solely with a view to dividends; its one aim, the greatest profit on the smallest possible cash investment; its tactics, bluff and the non-publicity of its list of stockholders. It will give only so much of the less profitable service as is forced on it to meet or prevent competition and, while professing to meet every demand, asks, when it dares, prohibitive rates in rural parts —once as high as $90 a year. The policy of the Independent telephone movement, on the contrary, is that which best serves the subscribers. The subscribers are largely local stockholders, content with a reasonable return on their individually trifling investment in addition to satisfactory local telephone service. As to the organization, it varies in legal form to meet the local requirement, but has no large and popular telephone subscription and usage, both the cause and result of low rates. Local management and proprietorship meet at first hand local requirements, responding freely to every demand. The above are the primary and vital considerations, profit being secondary.

To the country physician, the most progressive and best educated business man of rural Canada, belongs the credit of originating rural telephony, adapting it to the requirements of his exigent profession and starting it on its swift evolution of progress. Out of eighty-five Independent telephone systems in Ontario with which the writer has had communication—and almost daily new ones are brought to his knowledge—over forty-five have been started by country doctors for the benefit of their practices. He builds some miles of cheaply constructed line, placing a telephone here and there where customers can conveniently go to telephone him for emergency directions, to get him quickly to the sick bed and to keep him in touch with his patients. Having tasted telephone, the farmers desire it in their homes and to oblige them he installs and connects other telephones with his line. Soon the party line is overloaded; it is divided into lines of ten to twenty telephones each; standard poles and equipment are utilized; a switchboard has to be used and a central established. The line is turned into a co-operative system, branching still further out, the subscribers generally taking stock, a few renting telephones, all acting as agents in getting their relatives and neighbors to join in. Then becoming incorporated as a limited company they desire to obtain access to the nearest postoffice and village business places.

The farmer with a telephone in his house finds it most valuable and, once having one, will not do without it. A horse has indigestion; immediate aid will cure and delay kill. The farmer telephones to the veterinary, has speedy treatment given and saves $150. He wants a repair for a machine; to drive to town means half a day's loss of time; he telephones the implement agent, who sends the article, and working at home he saves a field of cut grain. He calls up the grain buyer, ascertains prices and can decide whether to sell or not without taking the produce first to the market. In the evening the cattle or hog dealer calls him up and next morning the farmer delivers the stock at the car. A fire occurs and he calls his neighbors and, with their aid, saves property.

No one needs the telephone—no one appreciates it—as much as the farmer, except the busy city office man. The former isolation of farm life passes. With a dozen friends on his party line, a system within a system, he has social relations at any hour, night or day. Thus, one understands the phenomenal growth of the rural telephone under favorable treatment, and also its permanency. Listen for an hour to a party line and you may hear the whole of the drama of life, as I have. The greatest marvel, the greatest romance, is the telephone. It throbs with the quick, full current of life.

The village merchant, to hold the good will of his farm customers who have local telephones, wishes the same telephone; likewise the village doctors, lawyers, veterinaries, banks, implement agents, etc. The villagers drift into the business quickly, and, construction being cheaper through local labor and a full knowledge of local factors, the rates are much lower than the Bell rates. The telephone is recognized as a virtual neecssity and so the local telephone system becomes general and permanent. The demand for town connection follows, and thus all over Ontario the numerous rural lines come knocking at the gates of our towns and cities for entrance, and will not be denied; and these, in order to prevent their competing towns acting first and stealing the trade which follows the rural telephone, must respond to the Independent telephone movement. Within twenty miles of the Toronto market up to within three miles of the city limit, rural companies are making rapid growth; on some roads every other farmer has his telephone from the rural company, owned by himself or his neighbors, while old Bell subscribers are throwing out their instruments and taking stock in the local companies with entire satisfaction.

Strong and rapidly growing rural lines approach near to the outskirts of London, St. Thomas, and St. Catharines, and have already reached Woodstock, while other towns are becoming similarly besieged. Peterboro and Brantford have competing systems. The same tale is being repeated in Canada which has been unfolded in the States. Take, for instance, Indiana, a state equal in population and wealth to Ontario, but having a large foreign element, and probably not equal to that province in education. There, rural lines started about nine years ago, passing through a similar process of development. Indiana has to-day over 200,000 Independent telephone subscribers, and 400 companies having no connection with the Bell company. The latter, notwithstanding its start years before under a monopoly entrenched behind patents, with unlimited capital, and all the

combined advantages of centralized and highly organized management, has only from 30,000 to 40,000 telephones, as claimed, one telephone to every ten men, women and children in city and country. Iowa has over 200,000 Independent telephones, Ohio 248,000, with none in Cincinnati, against the Bell's 120,000, including that city. Toledo has three Independent to two Bell telephones; Cleveland about 23,000 on each system; Louisville six Independents to five Bell; Rochester, New York, in January, 1906, had about 10,000 Independent telephones, and the Bell about 8,800. Buffalo then had about 11,000 Independent telephones (today it has about 14,000) and the Bell about 20,000. Baltimore, St. Louis, and other cities, large and small, have the competitive systems. Detroit, which, having two systems once, had gone back to a monopoly, is reverting to competition, and an Independent plant is being installed. San Francisco, Seattle, Washington, D. C., Milwaukee, and others of the great American cities have granted franchises to Independent companies. Chicago, in Illinois, near Indiana, Ohio, Iowa, and other Independent telephone states, has so felt the competition of cities having Independent systems that in order to save their trade the manufacturers and wholesalers of Chicago attacked the Bell franchise and have organized an Independent company. A fight is on in New York city with first blood to the Independent company, which is seeking to establish the validity of its franchise. This, when accomplished, will give the 3,000,000 Independent telephones of the United States connection with the American metropolis and place them on an equality with the two million and a half of Bell telephones.

All this represents the strength, virility and magnitude of the Independent telephone movement, and you, urban municipalities of Canada, are up against the same problem.

Let me repeat that you are face to face with the problem, and have to choose your policy. You may declare to the rural and Independent telephone people that you will have nothing to do with their organizations and enterprises; refuse to recognize the latest conditions of country life in relation to telephony; will deal only with their rich, arbitrary competitor, and aid it, financially, by yielding to its noncompetitive rates—morally, by granting to it a monopoly within your walls, over your highways, preventing rural and Independent systems from reasonable use of your streets and denying them the privilege of speaking to your business men and your citizens. Or you may acept the new situation and go along with this great movement, which, created spontaneously, adapting itself to every circumstance, has in a few years given such an impetus to popular telephony that, though kept back for years by the power of a monopoly, today bids fair to work the most startling and rapid industrial revolution of modern times.

The great argument urged by the Bell people is that telephony is a monopoly from the nature of things. Consider, however, not what is the nature of the telephone, but what is the nature of a monopoly. Can the leopard change his spots, or the Ethiopian his color? Can joint stock monopoly, by whomsoever administered, any more than autocracy, ever yield one single concession except under force, or can such a concession, ever endangered by a corrupting hand, continue unless guarded by eternal vigilance, backed by superior force?

The best test of an argument is, What does experience teach? In this matter you are referred to the history of telephones in the United States and its cities. The answer is loud and plain. Urban municipal governments, subject as they are to the electorate on direct vote, and thus subject to popular will, should be able to give better service than any private corporation. But, if they will not take up the municipal operation of telephones, then they should no more prevent the individual citizen from having a choice as to whose telephone he will use than it should say whose livery stable or whose telegraph line he must exclusively use. The ordinary process of business and the choice and action of individuals will ultimately decide after competition which shall be the most satisfactory purveyor to local telephone wants. If competition does not give better results than monopoly has given, the public will be judge and executioner.

In Ontario these are limited to five years, but a popular vote is not required, and the individual's natural freedom of trade in telephone accommodation is taken away without him having a voice until after it has been infringed. The Bell company has made haste to get such franchises, and, strange to say, has been fairly successful. In spite of the advantages of remaining open and retaining the possibility of competition as a lever, municipal councils have bought in a monopolistic market and thrown away the possibility of competition or of relief, all for considerations which from a company like the Bell are utterly inadequate. Esau got a snap compared with these municipalities. Every time the Bell ties a town up it affects more than that town; it hurts the chance of competition elsewhere, especially within a radius of several miles from the town and in other large centers. What this advantage is worth to the monopoly should be weighed, not against a few free telephones, or the use of poles for municipal service, the cost of either to the Bell being a few dollars, but against tens of thousands of dollars, since the effect is not simply in the municipality granting the monopoly, but actually and morally against competition all over Ontario. By having municipalities bound here and there by agreements expiring at different times, competition is seriously handicapped. The municipality throws away its chance of regulating charges to its citizens, for monopoly does not give prices on a competitive basis. It throws away the chance of having the equipment and service kept up-to-date; it throws down the possible chance of competition when the exclusive franchise expires —at least makes it more difficult—thus helping to perpetuate monopolistic conditions. What interests the rural parts most is, it hinders and flouts at rural telephone systems and the Independent movement.

Small, isolated lines were the rule, with energies diverted to self-defense against Bell opposition to any reasonable development—poor construction and equipment—no union or organization—no Independent manufacturers in Canada, thus entailing 25 per cent duty on all equipment, besides the annoyance to the farmers of customs and heavy transportation. Until a few months ago there were no telephone travelers on the road, no expert labor or telephone experts, an absence of knowledge of the business; untried business methods not intended for commercial enterprise, limited in everything; absence of trunk line connection except on conditions enforced by a competitor, which strangled development, and finally turned the isolated local enterprise into the hands of the giant competitor. Opposition and obstruction exerted by the transportation companies, which were in open alliance with the Bell, by every method worked to discourage local lines.

Under the stimulus of the inquiry started by Sir William Mulock, the hero of Canadian Independents, and by reason of the publication of the information obtained under such investigation through the conscientious work of Mr. Francis Dagger, the Canadian people have arrived at such a state of knowledge of telephone affairs that they know pretty well the possibilities of Independent and municipal telephones. Last September, for the first time, the Independents met and organized an association, whose objects are: "To make more popular, and to improve telephone systems; to defend and spread the Independent movement in Canada." To this organization all municipalities have welcome admission as members. This association has been actively at work carrying out its objects from Winnipeg to Cape Breton, though more especially in Ontario, Quebec and New Brunswick. To show the present strength of the

movement I quote from a telegram sent to Sir Wilfrid Laurier towards the close of the session, signed by some of the prominent Canadian Independent men, representing several provinces: "Over ninety absolutely Independent systems, with about four thousand Canadian stockholders and over two millions cash invested." This, I find, understates the facts.

Three obstacles to Independen telephony in Canada are:

1st. Bell opposition, which, while it is all that ingenuity can devise, is always in the end futile, having against it the greatest asset of the Independents, viz., public good-will.

2nd. Long-distance connection, which, however, with local or rural lines, is not an essential, 95 per cent of the subscribers' conversations being with their immediate neighbors, and another 4½ per cent being held with similar connecting lines which exist over large areas. The average long-distance calls which the ordinary man will have will not exceed half a dozen a year, except those whose business is with distant parts. The ordinary man can go to a Bell office and use its long-distance service, paying just the same as a Bell subscriber. In the United States long-distance lines connect the local companies with copper circuits.

Proposing to follow the same method, the Provincial Long Distance Telephone Company last May obtained, with the support of the premier, a charter from the Ontario legislature, and will at once construct the highest standard trunk line for long-distance business, leaving the municipalities and local companies to supply local service, and dividing with them equitably the long-distance revenue. This company is a quasi-government institution, as connection can be compelled by any person, company or municipality on terms to tbe agreed upon or imposed by the Ontario municipal board, which has control of the rates, and will settle all difficulties that may arise between the company and the public. The company has all the merits of government ownership without its faults. Under the late legislation at Ottawa the Bell can be compelled to give connection so far as long distance traffic is concerned.

It is doubtful if the rural lines will, after mature consideration, accept this provision if they can have long distance connection through other sources, for the reason that friendly alliances with the Bell will, as they have done in the past in Ontario and over the border, result in the stagnation of the connecting company and its ultimate absorption secretly or otherwise. It is only reasonable to suppose that a company such as the Bell, doing everywhere a local business, cannot afford to encourage any operating systems which do business more cheaply, thus discrediting its higher rates. Also it must, if possible, keep down other companies for fear that the stronger ones may break away and compete over a large district, a well-known tendency for a local company through necessity to extend its territory, thus making inevitable a conflict between the Bell and the local company. On the other hand, a purely trunk line company is a non-competing complement to a local company.

3d. Railway hostility, denying admission to stations, obstructing crossing tracks, refusing to give information to shippers over Independent telephones. Legislation has improved this a little, but only in a half-hearted measure. Next session the fight will be resumed. Our strength is developing in rural parts so much that soon no parliament will dare to say "no" to our reasonable demands.

Rural lines have now been accepted by banks as worthy of credit for reasonable requirements. Our revenue, we find, is sufficient to justify extensions with profitable results. People no longer hesitate to invest in them, believing these systems are established and permanent. Existing stockholders soon desire to keep the stock to themselves. The same condition is here as in the United States, where there are about 5,000 Independent companies, with fewer failures among them than among American banks. The companies which have failed have almost all been Bell subsidiary companies, or Bell connecting companies, having received Bell chloroform.

A factory has just been started in Toronto which will make the highest grade standard instruments and equipment. The American factories are alive to the Canadian market, and many are establishing agencies. All of these have to push their goods, and the telephone business will be developed systematically. In all probability within five years there will be more Independent than Bell telephones in Canada. This is not prophecy, but a calculation from present conditions in view of the known result across the line, which, in less than five years, was practically thus. In Ontario last year companies did well to start with ten subscribers; this year it is usual to start with 100 to 600 subscribers. In Quebec in 1905, Dr. Demers tells me, his four companies installed 1,200 telephones, all rural, against 12,035 by the Bell in all Canada. In the first forty days of 1906 he put in 300 more. That is at a rate of 2,400 a year. He is now invading Quebec City and his trunk lines are unexcelled in America. This is the best indication for the future.

THEY DON'T ANSWER

By J. P. Boylan

THIEF among the traffic complaints received in a large telephone exchange is that of a subscriber taking issue with the operator on receiving the report "they don't answer." He is sure someone is there to answer the telephone, and indignantly calls for the chief operator or exchange manager to file his protest.

Then again a subscriber will send a strong letter to the company stating that Mr. Blank called his office and was told he did not answer, when according to his statement, the bookkeeper was within a few feet of the telephone at the time, and as a result of not receiving the call he had lost a valuable order. A thorough test of the telephone and a careful inspection of all wires and apparatus would probably show that no mechanical trouble existed, and a close observation for several days would not throw any light as to the cause of the irregularity complained of. The matter would, as far as the company was concerned, resolve itself into one of two things; either the person who claimed to have made the call did not do so, or the clerk who claimed to be in the office at that particular time was really out of hearing distance of the bell.

A notable instance of this kind occurred recently in Cleveland. The manager of a large laundry establishment complained that he was losing business due to the telephone operators informing his patrons that he did not answer the telephone. The usual tests and inspection indicated that there was nothing mechanically wrong.

The complaining subscriber was then asked to furnish the telephone number and name of the party who was unable to reach him by telephone, and a representative of the telephone company was detailed to interview the calling party. The representative had no sooner explained his mission than

the other began to laugh, and replied, "Well, to be frank in the matter, I did not call him at all. That fellow, who happens to be an acquaintance, has pestered the life out of me to give him some of my work, and to get rid of him the other day, I told him I had called him by telephone and was unable to get him. Of course, I would not wish you to mention this matter to him, and I didn't realize when I took this means of getting rid of him that I would cause the telephone company any trouble. Yet, it's clear to me now, and you may be sure it will not happen again."

Numerous other instances have come to light of where forgetful husbands and neglectful employes have placed the blame on the telephone company, when asked why they had not called up as arranged. Then again, the prevarications of others claiming to have been within hearing distance of the bell, and insisting that it had not rung, have caused the company no end of trouble.

In Cleveland, the Cuyahoga Telephone Company average fifteen hundred "don't answers" per day, which is about 1.3 per cent of the total originating calls made, and while not above the average experienced by other large companies, it was thought that by making a careful study of this item, and investigating each instance for twenty-four hours, something might develop which would tend to reduce this number.

Accordingly, printed slips were furnished each of the "A" operators, and they were instructed to fill in the telephone number which did not answer, the number of the calling party, the number of pair of cords used, the position number, the operator's number, the date and time. A messenger girl was detailed to collect these slips every few minutes, and turn them over to the record clerks, who would first determine whether the number called for was a working line. In case the number was recently vacated, the slip was referred to the chief operator to investigate whether monitor mark was omitted from multiple, or whether the operator had failed to notice monitor mark.

As each batch of slips was received from the messenger, the record clerk would number each slip serially, so that on referring the slips to different departments, they could be charged by number, to guard against loss.

The record clerk, after noting name and address on the back of each of the remaining slips, referred same to trouble department, and if line was known to be in trouble, notation to that effect was made and slip returned to record clerk. In the event of the trouble department having no record of line being out of order, a test was made, result noted in space provided, and slip returned to record clerk.

On all slips where tests indicated that line was clear, the number was called out on twice the same day and twice the following morning, by the record clerk, and in all cases where parties admitted that no one was at home at the time when "don't answer" occurred, the slips were excluded.

Following this, the record clerk referred to the subscribers' record, arranged alphabetically according to streets, and called the next door neighbor of the party who did not answer. In most cases the record clerk would be informed that the house in question was vacant, or that it was locked and all the folks were away.

The remaining slips were referred to the district troublemen, who investigated, and after entering findings on slips, returned same to record clerk, where they were assembled.

The result of the twenty-four-hour record of "don't answers" is shown in the following statement:

	Calls.	Telephones.
Number of don't answer calls due to subscriber..	947	673
Number of don't answer calls due to operator....	34	25
Number of don't answer calls due to maintenance	166	118
Number of don't answer calls due to miscellaneous	141	100
Total	1,288	916

DATA OBTAINED BY CALLING SUBSCRIBERS.

	Calls.	Telephones.
No one there to answer telephone	518	388
Stepped out; in yard; other part of the house, etc	75	63
Telephone "out of order"	124	68
Too busy to answer telephone; theaters, etc	91	14
Subscriber slow in answering telephone	49	35
Subscriber asleep; did not hear bell	8	6
Public places—waiting rooms, pay stations, apartment houses	12	9
Cannot hear bell; due to telephone in booth or poor location	2	2
Party moved; neglected to notify telephone company	2	2
Private branch exchange; anybody answers	1	1
Drops did not operate; fault of subscriber; had fastened same	1	1
Answered Bell telephone, mistaking it for Cuyahoga	1	1
Operator had trouble collecting nickel; called party refused to answer again	1	1
Plugged bell at night; forgot to remove in morning	1	1
No such number; fault of subscriber	98	86
Telephone taken out; operator failed to observe monitor mark	16	11
Telephone number changed; operator failed to observe monitor mark	14	10
Telephone number changed this date; monitor mark not on board	4	4

DATA OBTAINED BY SENDING TROBLE MAN.

Nothing found; all apparatus found O. K.	141	120
Telephone "out of order"	42	30
No one there to answer telephone regularly	33	28
Stepped out; in yard; other part of house, etc	21	15
Subscriber moving	19	13
Cannot hear bell; due to telephone in booth or poor location	8	6
Public place; elevator boy to answer telephone; did not hear	1	1
Switch on telephone placed improperly	1	1
Saw mill; cannot hear bell	1	1
Answered Bell telephone in mistake for Cuyahoga telephone	1	1
Too busy to answer telephone	2	2
Total	1,288	916
Branch exchanges; don't answer calls on outgoing trunks; not investigated	147	
Total, representing 1.3% of the originating calls	1,435	916

A BLIND OPERATOR.

One of the most rapid and accurate operators in the Virginia City (Nevada) telephone exchange is Miss Susie Davis, a 20-year-old girl, who is totally blind. A few months ago Miss Davis took up telephone work, and in spite of the prediction of friends that she would be unable to do the work, she soon mastered all the numbers on a large switchboard. She works as fast as any of the other young women, and her record shows that she makes fewer mistakes than many of the employes. For a number of years she has been attending the school for the deaf and blind at Berkeley, Cal.

A STUNNING REQUEST.

"Nerve," "gall" and "cheek" are some of the names it is called, but a man who has an office in New York has found a brand which hasn't been named.

He has a telephone, and the man next door to him has none. The man next door came in recently and asked:

"May I use your telephone a minute?"

"Certainly; go ahead. Help yourself."

The man next door looked up his number, then turning to the owner of the telephone, said:

"Will you please step out in the hall a minute?" It's a private matter I want to talk about."

The owner was stunned for a minute, then picked himself up slowly from his desk and walked out in the hall. Easy? No, he's simply too good natured.

MANUFACTURERS DEPARTMENT

NEW TYPE OF HAND TELEPHONE AND BELL BOX.

Since the organization of The Wire & Telephone Company of America, at Rome, New York, some eighteen months since, considerable interest has been displayed in the telephone field regarding the output of this company, it being generally known that at the organization it had acquired valuable patents as issued to Messrs. Houghton and

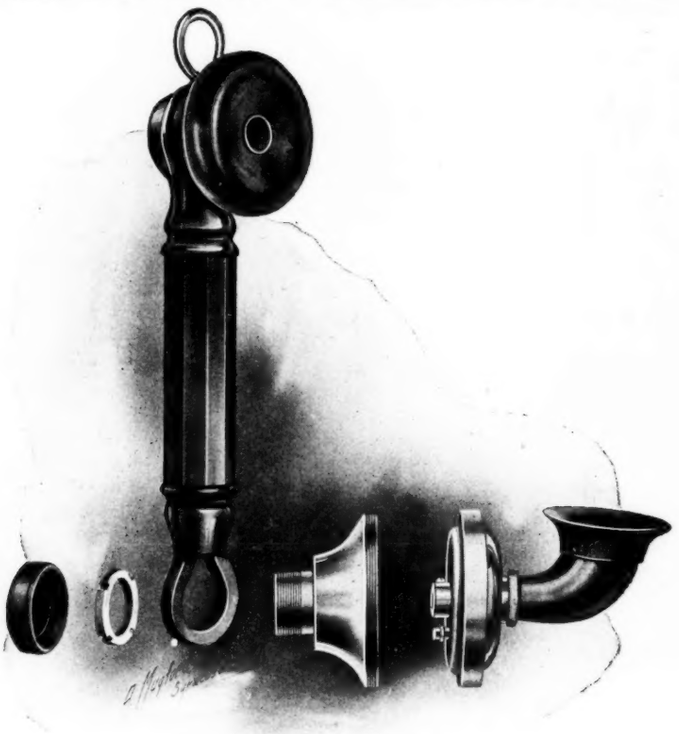
Easophone Equipment No. 100.

Potter, since which time the company's modernly equipped new plant has been devoted to the development and perfecting of telephones and telephone apparatus, to be manufactured under these and other patents and to be known under the trade name of "Easophones." The Wire & Telephone Company has been reticent regarding giving information concerning its product until the apparatus had demonstrated its value in practical service for a period of time; however,

Easophone Hookswitch.

the company presents this month a description of its new hand telephone and bell box, which is designated as Easophone equipment No. 100, and we believe that owing to the many original features embodied in this equipment it will have the serious consideration of telephone men generally.

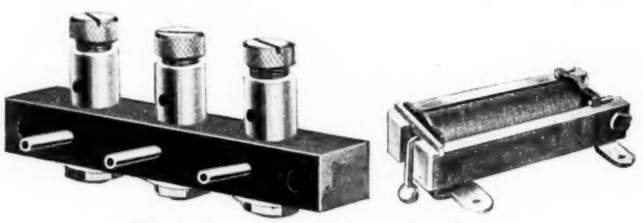
In this hand type of telephone many objectionable features have been eliminated, in addition to the production of an instrument which is not only handsome in appearance, but practically indestructible. This instrument is provided with a long horseshoe type of receiver magnet, which forms the base of construction over which is molded in one piece the handle and receiver case. The instrument is also provided with a solid back long-distance type of transmitter, which is locked rigidly to the annular heel of the horse-



Easophone Parts.

shoe magnet, affording a solid backing for the transmitter cup. By this construction it will readily be seen that not only is the long horseshoe magnet type of receiver attained, doing away with the watch-case type of receiver, but also a construction of the greatest rigidity and strength is secured.

The solid ring support of this instrument, the two electro-magnet cores, together with the metal covering between the two arms of the permanent magnet are firmly riveted together into one solid part. The vulcanized hard rubber



Easophone Binding Posts and Ringer.

covers the entire upper part of the instrument, and it is only necessary to use slip coils over the electro-magnets projecting from the molded receiver case, which coils are held in fixed position by means of nickeled plates.

Between the arms of the permanent magnet is provided a channel of ample dimensions to permit of easy introduction and withdrawal of the cords which go directly through

the instrument to the connecting studs of the receiver, to which they are soldered.

The transmitter used is of the solid back long-distance type, and by a novel method of assembling the parts, a large number of screws heretofore used in transmitter construction have been eliminated. The construction of the entire transmitter is such as to bring about exceptional solidity and simplicity in the design. The back of the transmitter is rigidly fastened to the heel of the horseshoe magnet by a lock-nut, over which a rubber cup is screwed. All connections are made internally and are so few in number that annoyance and expense from this source are entirely done away with.

The hard rubber horn-shaped mouthpiece is held in position by a friction washer that permits it to be held in any required position and prevents accidental removal. The receiver shell and handle are made of the best grade of hard rubber and finished in a high polish, the transmitter and supporting ring being finished in extra heavy nickel.

The small and compact bell box is made of cold-rolled steel, finished in black enamel of brilliant luster, and is very handsome in appearance. It contains complete equipment, including ringer movement, switches, induction coil, condenser and cord terminal blocks. The ringer movement has but one coil, for which a patent has been asked, and The Wire & Telephone Company of America claims that owing to its simplicity it is less subject to troubles than the old type having two coils.

The vibrating armature passes through the core of the single coil and requires absolutely no adjustment. It is made extremely light in order to give a minimum moment of inertia and adapts itself freely to any frequency of current.

The hook switch can be readily placed on either side of the box in the location desired by removing the draw pin, which can be done without the use of tools. The company also supplies a hook switch which can be mounted on a desk or wall independent of bell box, permitting the Easophone to be placed wherever most convenient without regard to the location of the bell box.

The core of the induction coil is made up with soft annealed iron wires, the windings being of the best quality of "Romeoid" silk insulated magnet wire of its own manufacture, and is covered with heavy glazed pebble linen cloth to protect it from injury. It is held in place by means of metal springs, which are riveted to the bell box, making it exceptionally convenient to remove or replace.

The circuit contact springs consist of five flat German silver springs provided with platinum contact points, and are rigidly mounted with hard rubber insulation throughout, separated with hard rubber insulators to hold same in fixed relative position. All contact points are in plain view for inspection.

The condenser is put up in sealed Japanned metal case and forms the back of the bell box, being held rigidly in position in frame work in connection with springs shown in illustration.

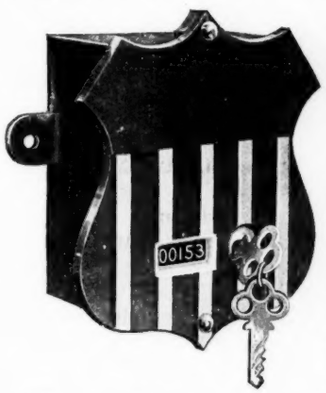
The cord terminal block is of polished hard rubber and the line terminal block upon the top of the bell box is equipped with Houghton patented binding posts, which prevents the creeping or cutting of the wires, and to the bottom of the binding posts are affixed tubes which are inserted through the bell box for making connections.

A new method of adjusting the bells is provided for on the outside of the box, bells being adjusted by the turning of two set-screws. It will also be noted that the bell striker is protected from any liability to injury from external sources of any kind.

Telephone users will be interested in obtaining The Wire & Telephone Company of America's Bulletin No. 101, which describes and illustrates in detail this equipment, which will be mailed by them for the asking.

NEW MEASURED SERVICE REGISTER.

Following the adoption of "the shield" by Independent telephone companies as their standard emblem, the Gray Telephone Pay Station Company of Hartford, Conn., has recently designed and placed upon the market a pay station in the shape of a shield, finished in red, white and blue. As these pay stations are distinctive of the Independent service, the sales have been large. The Gray company now comes to the front again with a measured service register which in shape and color also is patterned after the badge of the Independents. A large order for this design has been recently placed by the Mutual Telephone Co.



These registers can be used on any ordinary wall or desk telephone of either common battery or magneto type, and in operation are entirely mechanical. They are intended for service on either private or party lines. Where they are installed the subscriber calls in the usual way and when the connection is made the operator requests the signal. With the turn of the key by the subscriber, the signal is sounded and the counter actuated. The user has at all times before him an accurate statement of the service and at certain periods the account is taken from this register in the same manner as with gas or water meters.

With the tendency for measured service growing, especially in the residential districts, this device should meet with much favor. Design patents on this register have been obtained by the Gray Telephone Pay Station Company.

DANCING LUCIFER.

An immense image of Lucifer, the insignia of the Sons of Jove, will be first shown at the Electrical Show at the Coliseum, January 14-28, 1907.

This device is built of a solid background fourteen feet wide and fifteen feet high, and contains approximately 800 lamps ranging from 4 to 50 candle power. Contrary to appearances, there is nothing movable about the device. It is absolutely stationary in every part, no lamps move in any form, the entire effect being created by a flasher. It might be called a combination of a talking sign and a moving picture machine with incandescent lamps taking the place of an illuminated film. It has never before been exhibited in public and involves a combination of features never before shown in the art. Egbert Reynolds Dull is the originator and the work is executed by the firm of which he is the head, the Reynolds Dull Flasher Company, Chicago.

The operation is as follows: From a perfectly black background there appears the outline of his satanic majesty, in red lamps, in salute position, his right hand to his forehead and the forked tail wagging to and fro. Then as he disappears, instantaneously in its place appears a skeleton in white lamps fifteen feet high, standing in the same position. The skeleton salutes, and immediately proceeds to dance a jig after the order of the "split," half a dozen times, when he again straightens up and salutes, takes his head off his shoulders, holds it in his right hand, then throws it into his left, and throws his head back and forth from one hand to the other half a dozen times. He finally puts it back on his shoulders, salutes, and dances the "Highland Fling." He next straightens up again, takes his head off his shoulders and holds it in his left hand, then throws it down on his left knee, kicks it over his right knee, picks it up with his right hand, and puts it back on his shoulders, and in-

stantly reappears again as his satanic majesty in red lamps.

R. E. WILLARD.

Mr. R. E. Willard, who has recently joined the staff of the Long Distance Telephone Manufacturing Company of South Bend, as its Southern representative, is a loyal Independent in every sense of the word. Before associating himself with the Long Distance concern, Mr. Willard was connected with a large supply house in St. Louis, where he formed an extensive line of acquaintance among the telephone men of the south and southwest. Mr. Willard is financially interested in Independent telephone properties in Wisconsin and in addition to his wide experience as a salesman he has a practical working knowledge as an exchange constructor. His experience in all branches of the telephone business well adapts him to his new field, where he will be of undoubted value both to the Long Distance Manufacturing Company and its patrons.

R. E. Willard.

Mr. Willard will have his headquarters at Memphis, Tennessee, where he will be pleased to meet prospective investors in the Independent telephone field.

LONG'S PATENT MUFFLER FOR TRANSMITTERS

There being a demand for any device that will add to the efficiency of the telephone or the comfort of the user, the Gray Telephone Pay Station Company of Hartford, Conn., has placed on the market a patent muffler feeling that it will give entire satisfaction.

Long's Patent Muffler.

It is a well known fact that extraneous sounds acting on the transmitter while a message is being received tends to confuse the listener. This is especially true on long distance connections. Many telephones are now being used in offices and such places where with open windows the noise of street traffic interferes considerably with the telephone service, for all such places these mufflers should prove indispensable.

Quite often a person using the telephone for business purposes desires during the conversation to ask for some information not intended to be transmitted over the wire, for such cases these mufflers are well adapted, allowing the user to open or close the transmitter at will.

We believe this to be the first device that has been provided that can be operated with facility and effectually shut off all sound action at any desired moment. The fact that it is common practice to place the hand over the transmitter while receiving a message proves conclusively that something of this sort is needed. These mufflers can be used upon any telephone in present use.

NEW SWITCHBOARD IMPROVEMENT.

The Swedish-American Telephone Company, Chicago, has recently placed on the market a switchboard improvement worthy of special mention, as shown by the following illustrations. Figure 1 represents a self-contained, self-restoring type of drop and jack which can be removed as a unit from the switchboard by unscrewing two nuts, as shown. Figure 2 represents a drop and jack of the same type as above described, showing method by which the coil can be instantly removed and showing the coil being removed. This is accomplished by releasing a small spring which is mounted on top of the drop tube and which is directly below the armature. This spring is in no way a part of the circuit, its function being only to hold the coil in position. As shown in the illustration the shutter is mounted on the end of the coil core and is removable with the coil. Figure 3 shows the coil completely removed. It is impossible to return the coil to place without making good permanent contacts. The removal and replacing of the coil is accomplished without in any way disturbing any other part of the equipment. All chance of leakage or poor contact is entirely eliminated.

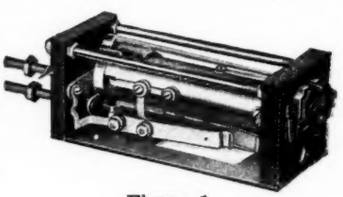


Figure 1.

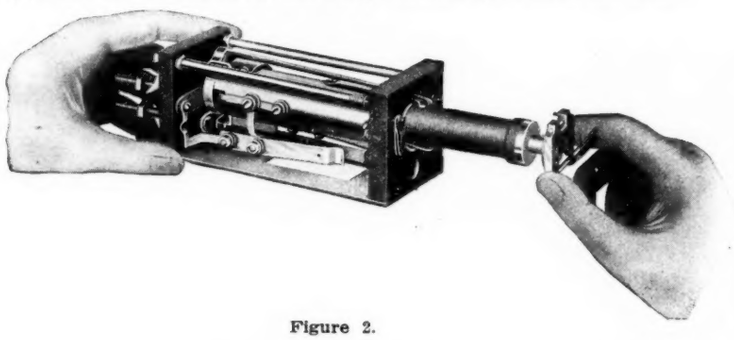


Figure 2.

Figure 3.

TRADE NOTES.

THE STOLZ ELECTROPHONE COMPANY and Mears Ear 'Phone Co. will exhibit devices for enabling the deaf to hear, in space 15 F, at the Chicago Electrical Exposition, Jan. 14-26.

AN ARTISTIC SOUVENIR POSTAL CARD, showing its extensive factory, has been issued by the Swedish-American Telephone Company. The card is printed in colors and is a most attractive advertisement of the Chicago plant of the company.

MCROY CLAY WORKS mailed the trade a blotter containing a calendar for the last month of the year and the usual poem, which was "Folks in Ruts." The company invites its correspondents to address all communications to 445 Rookery, Chicago.

THE SEMI-MONTHLY STOCK SHEET and price list of the Commercial Supply Company of St. Louis has been sent to the trade, and gives full information on the wire and cable market. The company will send a sample of its "Commercial High Grade" rope, which it claims to be the best, on application.

THE ILLINOIS ELECTRIC COMPANY, Chicago has just issued a new net price list and discount sheet, applying to its telephone catalogue Number 17 which will be sent to anyone upon request. Catalogue Number 17 contains everything required by a telephone company. It contains over 200 pages and is fully illustrated.

THE SWEDISH-AMERICAN TELEPHONE COMPANY will be located in Section E, space 12, at the coming Electrical Show to be held at the Coliseum, Chicago, Jan. 15 to 26. The company reports that it has heard from many of its friends and customers, saying they will be in attendance. The space occupied by this company is in the same location as last year.

THE GRAY TELEPHONE PAY STATION COMPANY of Hartford, Conn., has a very handsome new 80-page catalogue now ready for distribution. One of the late Gray products is a hotel pay station for automatic. Chief Engineer Long is constantly working on something new to meet every possible requirement of telephone progress. The catalogue will be sent on request.

THE ROLFE WIRELESS ELECTRIC CURLING IRON HEATER, manufactured and sold by the Rolfe Electric Company, Rochester, N. Y., fits over the ordinary 16 candle power lamp and is not only useful but ornamental. The makers are finding a ready sale for the heater which is sent postpaid anywhere in the United States for $1.50. No knowledge of electricity is required to utilize it, and it is already for use.

FRANK F. HOWE, CLEVELAND, O., patentee and manufacturer of telephone apparatus, sends a clever calendar to the trade, on each monthly page of which is illustrated one of his devices. A trial sample of any instrument will be sent on order and specifications, and full descriptive leaflets can be had of the manufacturer by addressing Frank F. Howe, 502 Arcade, Cleveland, O. He has also issued a circular giving full details of the working of the Howe telephone, and a description of the "Howefonearm" and its advantages, chief of which is the fact that it gives free use of both arms and hands to write orders, turn pages in books, refer to memoranda, etc.

THE BUSINESS of C. H. Thordarson has been taken over by the C. H. Thordarson Electric Manufacturing Company, Chicago, incorporated under the laws of the state of Illinois with a capital of $100,000 and is located at 153, 155, 157 and 159 South Jefferson street, Chicago. The officers are C. H. Thordarson, president and director; Joseph W. Watkins, vice-president and director; John A. Brennan, secretary and treasurer and director.

THE BIGLEY TELEPHONE COMPANY, 56-58 Van Buren street, Chicago, has issued its bargain bulletin No. 2, giving latest quotations on telephones, switchboards and all kinds of supplies. The company assures the trade that the apparatus offered is not "second-hand" and that care has been exercised in selecting only standard and modern makes. The announcement is made that special attention is paid to winding and rewinding coils of all makes.

ROLFE ELECTRIC COMPANY, Rochester, N. Y., is offering its fuse box No. 2, which is said to keep dangerous currents outside and insure operators of telephone exchanges against damage suits. The box, which has been approved by the National Board of Fire Underwriters, is of extra heavy glazed porcelain, and requires no bushings or insulations of any kind. The cover is of galvanized iron held firmly in place by a screw in the center that threads into an upright brass binding post in the box. The fuse is the regulation approved type of line fuse which this company has so long manufactured. Every box is thoroughly tested before shipping and is guaranteed to give satisfaction.

THE AUTOMATIC ELECTRIC COMPANY, Chicago, is circulating two unique advertising folders calling attention to the progress of the Independent telephone movement. One is entitled "Now, on to Chicago!" and explains that the acquirement of the South Bend Telephone Company means the connection of Chicago with the Independent long-distance service. The other folder quotes extracts from Wisconsin and Arkansas newspapers showing the poor service given by the Bell companies. The Automatic Electric Company attributes the faults largely to inefficient operators and argues that the only remedy is to "patronize the Independent companies that can and will adopt the automatic system."

THE BLAKE SIGNAL AND MANUFACTURING COMPANY, 246 Sumter street, Boston, Massachusetts, has issued several instructive circulars showing how valuable the Blake signal system is for electric and steam railroads. Special advice is given the management of each class of railroads as to the advantage of using the Blake system. It is intended for use in connection with the telephone and to enable the interurban line dispatcher to signal to any telephone point when he wishes to communicate with the passing train crews. In other words, the Blake system is designed to give the electric road dispatcher the same command of train crews that the telegraph gives the steam road dispatcher. The literature sent out by the company fully describes its working. Testimonials from railroad managers who have adopted the Blake system are given and show that the system works successfully. The Boston & Worcester, Worcester Consolidated, Indiana Union Traction Company and all of the roads in the McKinley system,

including the Illinois Traction Company, use the Blake system, and are loud in their praise of its efficiency.

FRANK B. COOK has again made a big increase in his factory space, having added 12,000 feet of floor space December 1. This addition, Mr. Cook hopes, will enable him to materially increase his output and help take proper care of his rapidly growing business. His office has been moved and improved and all the latest office systems and appliances installed, and the same improvements have been made all through his shop. Mr. Cook thinks the outlook for a larger business in 1907 than in any previous year is very bright, and he is therefore preparing for the increase.

THE COMMERCIAL ELECTRICAL SUPPLY COMPANY, St. Louis, Mo., has mailed a very large edition of its 1907 diary for telephone men. For a utility advertisement this diary is most desirable for prospective users. The work is bound in full morocco with gold edges and contains a special telephone supplement which gives valuable tables and suggesitons for operators. We are advised by the company that it will continue from year to year to distribute this important work and that it will be necessary to make application a long time in advance in order to make sure of receiving a copy of the work. The edition issued during the past month was exhausted long before all who made request for it were supplied.

JOHN W. KELLY, JR., well known as a member of the committee of standardization of equipment of the International Independent Telephone Association, has resigned his position as superintendent of equipment of the Keystone Telephone Company, of Philadelphia, to become the superintendent of the General Acoustic Company, with headquarters in New York City. Mr. Kelly has been doing a large amount of work in devising and developing means to enable telephone companies to give their subscribers church, theater and election returns service. He has successfully transmitted concerts by telephone and distributed them to subscribers from sixty to one hundred miles away. He is especially interested in the "Dictograph," the latest innovation in the telephone line.

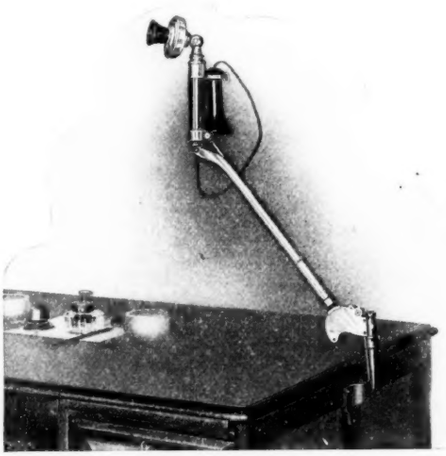
THE EUREKA ELECTRIC COMPANY of Genoa, Illinois, has recently put on the market a novel magneto drop and jack and a common battery target signal, which in most respects is new in its construction. It constitutes a great departure from any other drop on the market. It is a tubular lateral pole arrangement which is different from the usual practice in drop construction. It dispenses with the trunnion screws and consequent delicate adjustment when replacing coils. Nothing but the coil is handled when removing same. Its accessibility for inspection is claimed to surpass anything in this line. Its acceptance by the telephone people was demonstrated at the National telephone convention in Chicago last June where a model was exhibited and orders were received for over 1,000 the first day it was shown.

THE SWEDISH-AMERICAN TELEPHONE COMPANY, Chicago, has issued a handsome booklet containing letters of recommendation from telephone companies using its equipment. Accompanying the letters, which are reproduced in fac simile, are portraits of the writers, who are the secretaries, managers of the various operating companies represented. The large number of Independents who patronize the Swedish-American Telephone Company is well demonstrated by the symposium and the warm praise given the apparatus proves completely the satisfaction it has afforded the users. The booklet also contains pictures of a number of new exchanges equipped by the Swedish-American, and descriptions of the company's "New Swedish Beauty No. 88" and its 100-line switchboard and 100-line combination lightning arrester cabinet.

THE FLEXIPHONE.

It is not often that a newcomer in the telephone field lands at the top of the heap at one single bound and the fact that the Oliver Manufacturing Company of Philadelphia, Pa., has been able to present to the telephone public as their first effort the "Flexiphone," an instrument not only novel in general form, but perfectly developed in its internal and external construction, embodying features of constructive details that are of unusual merit, is undoubtedly largely due to the earnest co-operation of the well-known makers of high-grade telephone apparatus, the Holtzer-Cabot Electric Company of Brookline, Massachusetts, who will participate with the Oliver Manufacturing Company in the manufacture and general sale of the Flexiphone in the United States as special licensees. The readers of TELEPHONY should look into this new instrument with more than passing interest, as it is a remarkable conception of a new concern, possessing new blood and new ideas, unhampered and untrammelled by the conventions and ruts of "the way we used to do it," these conceptions being rounded out and carried to completion by the addition of a new frame hook and switch mechanism designed by the Holtzer-Cabot Electric Company, which mechanism we shall describe more fully further on.

We illustrate here a general view of the Flexiphone attached to the end of a flat top desk. The attaching device is provided with an angle head, adapting it to any kind of a flat top or roll top desk, to the wall or in almost any conceivable position. The adjustable arm is of cold rolled steel with a handsome hard rubber finish, trimmed in full nickel; the arm is carried by and longitudinally slides on an inner supporting rod; a double cam at the base imparts just sufficient end-wise motion to the tubular arm to maintain the pedestal portion always in an upright position during the vertical swing of the arm, which also has a horizontal movement on the supporting stud of the desk attachment. A most unique and very convenient feature of this invention is the revolving head carried on a hollow vertical stud at the upper end of the pedestal, this head supporting the transmitter and permitting a two-thirds rotation of same in a horizontal plane, making the mouthpiece accessible at either side or in front of the arm—"it always faces you." This rotative movement of the transmitter, together with the horizontal and vertical swinging of the adjustable "self-balancing" arm, makes this indeed a flexible telephone; hence its name, the Flexiphone. In this one instrument, the company claim, is a perfect desk or a perfect wall telephone with none of the faults and disadvantages of either; no fallen and broken instruments, no tangled or broken cords, no trouble and but little maintenance cost. The Flexiphone takes almost no room. You can put it anywhere, the biggest thing about it is the transmitter and what is better yet, it fits everybody, from the shortest to the tallest, either when sitting or standing.



The Oliver Flexiphone.

We now come to the parts that interest the inspector or trouble man. Remove one screw near the head of the pedestal and the transmitter and transmitter switch springs and switch hook lift from the upper casing, all self-contained. The outer casing may now be removed, the transmitter head put back in position and we have a complete operative telephone in which all spring contacts, cord connections, etc., are in full view, easily and instantly accessible. These cord connections are made to terminals fitted on a hard rubber block, securely fastened to the frame on which the switch springs are mounted. Hard rubber is the only insulating material used. The contact springs are of german silver with pure platinum points which in assembling by the inspector make long sliding contacts, keeping points clean and bright. These contact springs rest against stops under tension and the hook lever being independently supported and operated by an auxiliary steel spring, the full elasticity of the contact springs is used in making perfect contacts. This switch hook acts directly on the contact springs and absolutely has no lost motion.

With the exception of the two platinum contacts of the switch springs, there are no unsoldered contacts between

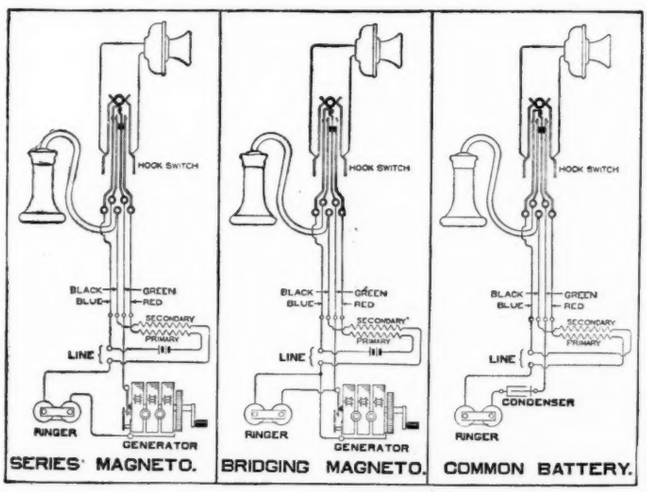


Diagram of Flexiphone Circuits.

the desk terminals and the transmitter. This will be instantly appreciated by the practical telephone man. The foregoing are unusually strong features and are worthy of the most careful consideration of telephone buyers and users. The Flexiphone will be supplied to the trade equipped for Common Battery Series or Bridging Magneto circuits. TELEPHONY readers should make it a special point to see this new telephone during the Electrical Trades Exposition in Chicago, January 14-26. It will be exhibited in space 1, section E.

You will note by the advertisement of the Oliver Manufacturing Company in this issue that the Flexiphone can be purchased through regular jobbers and manufacturers of standard telephones equipped with their individual forms of transmitters and receivers when desired. In conclusion, the remarks of an old telephone man, well known to the trade: "It is the greatest improvement in telephones that has been put on the market in the last two years."

IMPROVED FORM OF PROTECTION.

A novel arrangement of the carbon lightning arrester in connection with line fuse protection is that shown in the illustration, manufactured by the Rolfe Electrical Company, Rochester, N. Y., for use in its approved line fuse box No. 2.

The carbons are mounted on the end line fuse and the inner or large carbon being insulated from the fuse ferrule by a hard rubber washer or bushing. The two carbons are separated and insulated from each other by a dust proof dialectric and are held in place by a clamping nut on the end. Thus when testing, the fuse and lightning arrester are cut out of the line at one move.

This fuse box is approved by the National Board of Fire Underwriters and companies using it are secure from dam-

Rolfe Line Fuse and Carbon Protection.

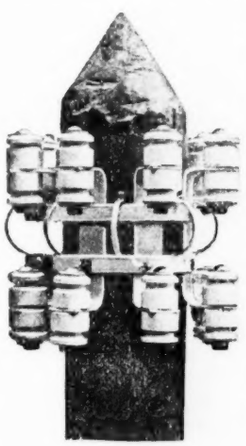
age suits arising from loss of life or property when foreign currents are carried over their lines. Full description, prices, etc., will be cheerfully sent on application to the Rolfe Electric Company, Rochester, N. Y.

NEW OLIVER DISTRIBUTING DEVICE.

The A. F. Oliver Manufacturing Company of Buffalo have brought out a distributing fixture for which they claim features that may prove of interest to those who are using small cable terminals.

The desirability of a fixture for use in connection with terminals having a capacity of twenty-five pairs and yet of such compactness that its use is fully warranted with a much smaller terminal, will, it is felt, prove in itself a recommendation.

The device itself consists of two circular split collars, which have their ends bent outward. Holes are drilled in the ears so formed and a bolt is passed through the holes in each ring.



Attached to the inner circumference of these bands are seven other pieces of iron which are bent in the form of an elongated U. These U-shaped pieces are drilled and attached alternately to the circular iron bands by means of bolts. That is, if the first U-shaped piece is bolted to the upper band, the second one is bolted to the lower band and so on around the circle.

This serves to hold the ring together and the U-shaped pieces in place until the fixture is placed upon the pole.

After the fixture is pushed down over the pole, fetter drive screws, better known as lag bolts, are driven in through the holes not previously filled with the bolts holding the fixture together. For instance, should the first U-shaped piece be bolted to the upper ring, the fetter drive screw is passed through a hole in the lower ring and the first U-shaped piece and into the pole. The second U-shaped piece would then have a fetter drive screw passing through it and the upper ring and into the pole.

This method not only attaches the fixture to the pole in such a manner as to preclude the possibility of its ever coming loose, but further helps secure the various parts of the ring to itself. When the ring is in position porcelain insulators of the well-known knob pattern are attached to the horizontally extending ends of the U-shaped pieces by means of stove bolts, washers being placed under the nut to prevent cracking of the porcelain insulator when tightening up on the bolt.

Attached to the pole and arranged around the ring are bent straps of iron which serve to act as a duct for retaining the wires leading from the fixture to the cable terminal. This insures that the wires will run down the pole at one point and keep them in a compact space.

The Oliver Manufacturing Company is placing this fix-

ture upon the market in two ways, complete, including insulators, distributing rings and necessary bolts for attachment, or without the insulators and round washers.

The purchaser can in this way provide his own insulators and attach them as required, not unlike placing glass insulators upon cross-arm pins. Also by providing his own insulators, the user insures uniformity of appearance with a lower first cost of installation.

The round washers are of the same size and dimensions as the ones now almost universally placed under the head of the bolt which attaches the cross-arm brace to the cross arm.

The capacity of this device is twenty-eight insulators, one twisted pair distributing wire can be attached to each insulator, in which case twenty-eight loops can be attached to the fixture. Should it be desired, however, to use single wire without rubber insulation, only one wire should be attached to each insulator and the capacity would be but for fourteen loops.

A pole line equipped with these fixtures having an aerial cable strung along it presents a much more sightly appearance than the older method which involved cross arms with their usual attendant mass of open wires.

When subscribers are close together a fixture of this class placed upon each pole and the cable brought to a small cable terminal as in the now familiar multiple tap system, reduces the amount of wire used to a minimum, not only saving much labor for installation of separate telephones but reducing the always present troubles which result from the use of open wires.

These fixtures have been carefully tested by experienced men and from the tests made under actual working conditions the various parts were found to be strong enough to successfully withstand many times the breaking strain of the wires attached. All of the various pieces are of the best material and all metal parts are thoroughly galvanized.

The A. F. Oliver Company have descriptive matter which they will gladly furnish to anyone upon application, and they believe that in placing this device upon the market, the man who builds and the man who pays will each be mutually interested.

ELECTRICAL EXPOSITION.

Chicago's second annual electrical show, which will be held in the Coliseum from January 14 to 26, 1907, will be the banner trade booster of the United States. More than 30,000 square feet of the main floor of the Coliseum has been sold to 150 of the leading manufacturers and jobbers, many of whom will make displays for others as well as themselves. Not a single branch of the electrical field will be neglected and the exhibits, as a whole, will be greater and more elaborate than they were in the show of a year ago. At this writing there are but five spaces left on the main floor.

Following the precedent established by the directors of the Electrical Trades Exposition Company a year ago, no expense or effort is being spared in making the coming show the greatest and most interesting trade exposition ever held in Chicago. It will be more than liberally advertised and special inducements will be offered to attract the attention of the public to the affair. The 201st anniversary of the birth of Benjamin Franklin will be marked by a special program Thursday, January 17, and handsome souvenirs will be distributed. Monday, January 21, will be "telephone" day and another appropriate souvenir will be given away. Thomas A. Edison day will be observed Wednesday, January 24, an occasion for another souvenir. During the two weeks of the exposition there will be several important meetings of electrical organizations, notably the Northwestern Electrical Association, which has its annual convention at the Coliseum January 16, 17 and 18. This affair is usually held in Milwaukee, but as a compliment to the Chicago members of the organization, many of whom are identified with the electrical show, the meetings are held in Chicago. The Sons of Jove will have a rejuvenation Wednesday night, January 16, and the Illuminating Engineers' Society will meet Thursday, January 17. The American Electrical Salesmen's Association will have its annual meeting Wednesday, January 24.

Ellery's Royal Italian Band has been engaged for afternoon and evening concerts throughout the two weeks of the show and the Coliseum Annex will be converted into an electrical "midway," several new and interesting amusement features along electrical lines having been secured.

BAIRD SHEET-STEEL CASH-REGISTER PAY-STATIONS.

The Baird Manufacturing Company, 1503 Briar place, Chicago, is just placing on the market a new model pay-station which has many new and striking features.

This new machine is a pressed steel product throughout and is made from very fine dies and tools so that every part is interchangeable. The finish is exceptionally fine and evidences painstaking care in the perfection of every detail.

Every part of the mechanism is accessible by simply removing the cover which has a separate lock from the cash box.

Baird Portable Set.

Baird Wall Set.

A striking new feature of this machine is a cash-register which counts nickels, dimes or quarters, and while safeguarding the integrity of the collector also protects the company's cash.

Showing Baird Pay Station Disassembled.

The signals in this machine, while corresponding with established signal codes are unique in several ways. Where a signal is composed of two or more bell tones a transmitter shunt gives a click between each and thus prevents mistakes or confusion. The bells used are made from a special metal, and have superior resonant and carrying qualities. Each signal stroke is absolutely uniform whether for nickel, dime or quarter.

An air valve controls the striking of signals so that a wide space is given between each signal stroke which with the click on the line make each signal unmistakable.

All mechanical noises are eliminated as the transmitter is shunted when the lever is pulled.

The company claims the machine is so well constructed and has so many unique features that engineers unhesitatingly commend it. Owing to the strength and simplicity of its construction the cost of maintenance is bound to be reduced to a minimum. It is made in various styles for wall, desk and portable use.

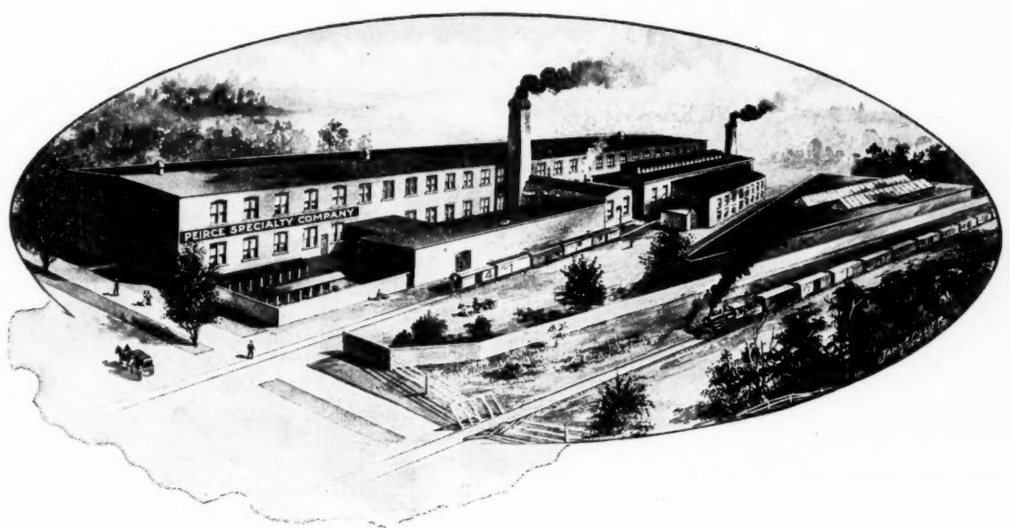
NEW PEIRCE SPECIALTY COMPANY PLANT.

In the accompanying illustration is shown the new plant of The Peirce Specialty Company at Elkhart, Indiana.

The growth of this company has been phenomenal even in the annals of the electrical industry. Starting in an obscure way in 1902 at 218 East Washington street, it soon found that it would need larger quarters; the company then moved to 12 and 14 South Jefferson street. The year 1904 found the company occupying still larger quarters at 42, 44 and 46 North Peoria street; again in 1905 the company found that these quarters were not adequate for its purpose and it removed to 105 South Jefferson street. Occupying these quarters but a short while, it was enabled by the purchase of one of the large telephone manufacturing plants to secure sufficient capacity so as to be able to, for the first time, manufacture its entire product complete. This found the company occupying premises at 241-247 South Jefferson street. It was soon apparent that even with the increased facilities the space would not permit the company to keep up with the demand for its well-known line of construction specialties, so the company caused plans to be drawn for a plant of sufficient size to warrant in locating permanently at one point. There were two things to be considered: first, power facilities; second, geographical location. Manufacturing sites from all over the country were submitted and after due consideration on the part of the officers, Elkhart, Indiana, was chosen as a permanent home for the Peirce Specialty Company.

From a shipping standpoint Elkhart is ideal, as from the standpoint of freight rates it is practically the center of the United States. The buildings shown in the accompanying illustration will be large enough to take care of the company's growth for several years; should it then be necessary, the company can purchase sufficient ground to make the necessary additions.

The specialties manufactured by the company which have proven so popular with the telephone and lighting companies are the well-known Peirce house brackets of all descriptions, corner irons, Peirce transposition brackets, Peirce expansive lead bolts, Peirce hammer-drills, and Peirce test connectors, and with the enlarged space now at the command of the company it is the intention to enter into the manufacture of the complete line of general construction material for electrical uses, to be of the same high quality as its present product. The company has on the press a handsome catalogue of goods of its present manufacture which will be sent for the asking. It has also issued a second edition of its booklet, "Transposition Methods." This little brochure is practically the only book printed today which treats of transposition. It shows the relative value of different methods now in general use, together with the manner of stringing practice, and is a valuable addition to any engineer's library. It will be mailed upon request.



New Factory Peirce Specialty Company, Elkhart, Indiana.

The general offices will be located at Elkhart, Indiana. The factory and experimental departments will have the personal supervision of Mr. C. L. Peirce, Jr. Mr. Peirce is the inventor of the different specialties which bear his name and as the head of the engineering staff, the company will from time to time introduce a number of new specialties of practical value to the telephone field.

A Chicago office will be maintained by the company, with a sales and purchasing department, at 241 South Jefferson street. The purchasing for the entire plant will be done from this office. The office will be under the supervision of Mr. A. L. Haase, who has been identified with the company since its inception.

Mr. C. L. Peirce, Jr., president of the company, to whose insight and practical knowledge of the telephone field is due the rapid growth of the company and the general adoption of its different specialties by the telephone and lighting engineers throughout the country, will continue to direct the policy of the company.

DIAGRAM OF HARGIS JOINT.

In the September, 1906, TELEPHONY, we published illustrations of the Hargis cable splicing joints. We show herewith a drawing that gives a very clear idea of this clever labor and money saving specialty. The Hargis cable splicing joint is in reality a vertical sleeve that has many good points, which, it is claimed, are not to be found in the horizontal wiped joint.

By the use of this joint the company claims one can be absolutely certain that splices will be weather-proof under any and all conditions. It is said this is not true of the horizontal joint as it is so very difficult to make a perfect "wipe" because there are so many conditions under which it can be defective. By the use of the Hargis splicing joint it is not necessary to have an expert cable splicer whose expertness depends upon his ability to make a safe wiped joint. A regular lineman can do the work better and

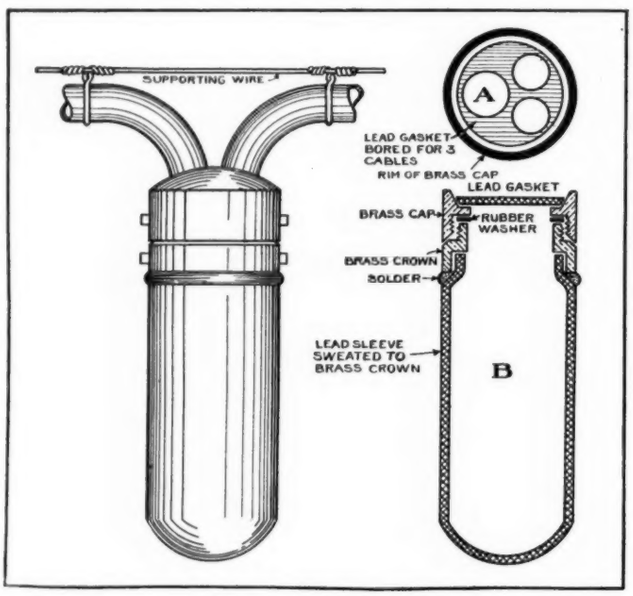


Diagram of Hargis Joint.

quicker with the Hargis splicing joint and he will save six to eight inches of cable on every joint.

W. N. Matthews & Brother of 226 North Second street, St. Louis, the manufacturers of the Hargis joint and Callahan cable roller, state that they are meeting with very gratifying success in the introduction of the Hargis joint, and expect a very large business this year. They have been somewhat handicapped in the past by their inability to get material fast enough to supply the demand for either Hargis joints or Callahan rollers.

ANOTHER STEP FORWARD.

The Central Telephone & Electrical Company of St. Louis, after repeated requests for a nearer supply point from which to make shipments to its large and growing trade in the southwest, have met this demand by the organization of the Central Telephone & Electrical Company of Texas. This concern commenced business at Dallas, Texas, January 1, in charge of Mr. Royal Smith, well known to the telephone operating trade in the southwest, and Mr. George F. Poertner, who has successfully traveled that section for the St. Louis house.

The Central Telephone & Electric Company of Texas has been incorporated with ample capital, and will carry in Dallas stock not only a complete line of the well-known "Central" telephone apparatus for both magneto and central energy exchange, rural line, hotel and intercommunicating installations, but a complete stock of all standard telephone construction materials, maintenance, supplies, tools, etc. Its buying facilities and mill connections are such that it will be enabled to quote attractive prices, and from the many expressions already received, it will no doubt meet with success from the start.

Carloads of goods have already gone forward and inquiries or orders addressed to the Dallas office will receive prompt attention.

TELEPHONES IN RESTAURANTS.

The following story from New York on the use of telephones in restaurants shows that the eastern metropolis is adopting the restaurant telephone, which has been in use in Chicago for a long time.

A man accompanied by two women entered an uptown restaurant and sat down at a table near the wall, toward the rear of the room. After the man had given his order to the waiter he added:

"Oh, yes; and bring me a telephone."

"A telephone?" repeated one of the women. "How can you eat a telephone?"

"It's the latest wrinkle," responded the man. "Wait and you will see."

Sure enough the waiter returned in a few minutes with a desk telephone and several yards of silken electric cord. The telephone was placed on the dinner table, and the waiter then attached the silken cord to a socket in the side wall.

The man of the party picked up the receiver, moved the telephone into a convenient position and then asked central to give him the box office of a Broadway theater. After ordering three seats for the performance that night he asked the women with him if they had any message they wished to send to anyone.

One of the women telephoned to her hotel about some rings she had mislaid, and the other telephoned to a friend relative to a shopping engagement for the next day. By the time they had finished with the telephone the waiter had returned with the dinner. Before serving it he disconnected the silken cord from the wall socket and carried the telephone away.

"These portable telephones," said the head waiter of the restaurant, "are novelties which are fast becoming popular. We have just introduced them here."

"Each table is so arranged that there is a socket handy to which we can attach a portable telephone. The wires all lead to a private branch telephone exchange which we maintain in an upper room. Each wire and socket has a number, and a guest at a table can arrange to have a friend call him up on the telephone while he is at dinner."

NO DOLLAR TELEPHONE SLOTS.

"Do you know why we did away with the automatic telephone having a dollar slot?" asked a telephone man recently.

There was no answer.

"Frankly then, in plain black and white, it was because we wanted to protect some people from their own asininity. We only have half-dollar toll boxes now, and there is no further trouble. It used to be that a man would come along, call up the place he wanted, and then when told to put a dollar in the box would carefully take out a bill and poke it therein. Then he would get mad and want to know why the connection wasn't made.

"To patch the matter up, it required very often the diplomacy of a Japanese ambassador, in addition to the manful efforts of the mechanic who fished the paper out of the machine.

"For that reason we did away with the old dollar slots and now have nothing higher than the half dollar. We are under the impression that there are no bills in this denomination and that we have a fair chance of getting silver."

OPERATING

A Paper Read Before the Manchester, England, Telephone Society

By G. F. Staite

THE title "Operating" is a very comprehensive one, and, of course, the whole question is quite beyond the scope of one paper. I propose to deal with only one detail, namely, the arrangement of duties and positions. This may appear on the face of it to be a somewhat simple matter and not of very great interest.

When I state, however, that the ideal arrangement has not yet been arrived at, that a great improvement on any present known system is possible, and that the arrangement of duties and positions is one of the most important factors in the giving of a smart service, it may give you some idea of the wide scope of the subject, and the interest which it really contains.

It involves an accurate knowledge of the following main points:

(1) The actual traffic.
(2) The value of the traffic.
(3) Work capacity of staff.
(4) Distribution of load.

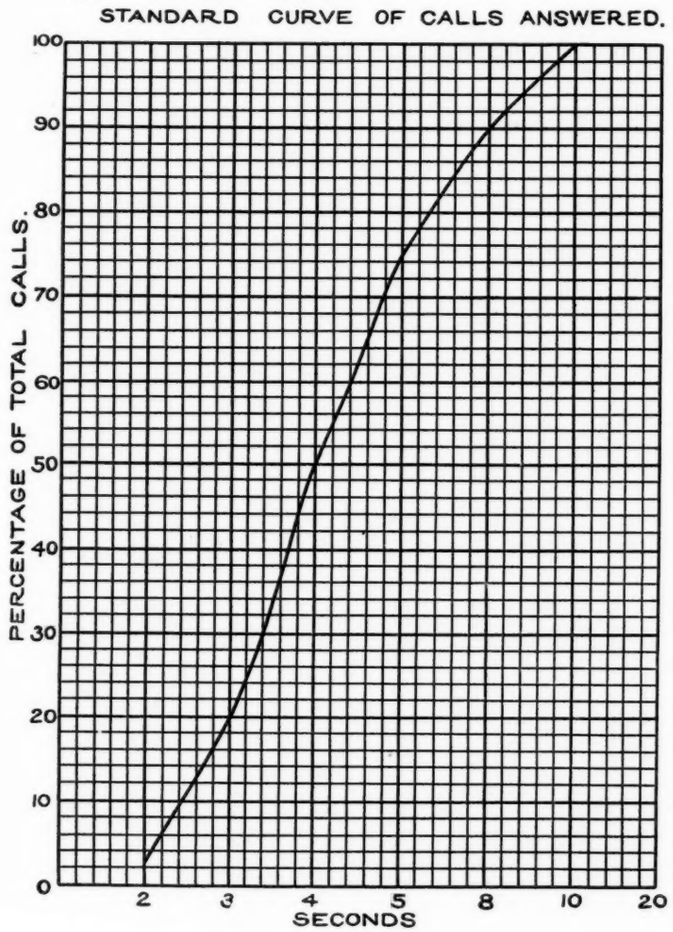


Figure 1.

Before proceeding to discuss these it will be as well to examine the broad rules laid down with regard to the service and the capacity of an operator.

Figure I shows main exchange standard curve of calls answered. This is supposed to be attained by every exchange on the company's system. For some reason the clearing after conversation is not standardized in the same way, but we can take it for granted that the same standard applies. The average attention according to such a curve would be 5.72 seconds.

The main exchange standard of capacity for operators is 100 calls per half hour, counting one junction call as two local calls. In addition, they allow certain excess to cover absence on holiday, or owing to sickness, and to make allowance for learners, etc.

These, then, are two important objects we have to keep in view: (1) To arrange the hours of duty so as to conform to the 100 calls per half-hour standard, and (2) to

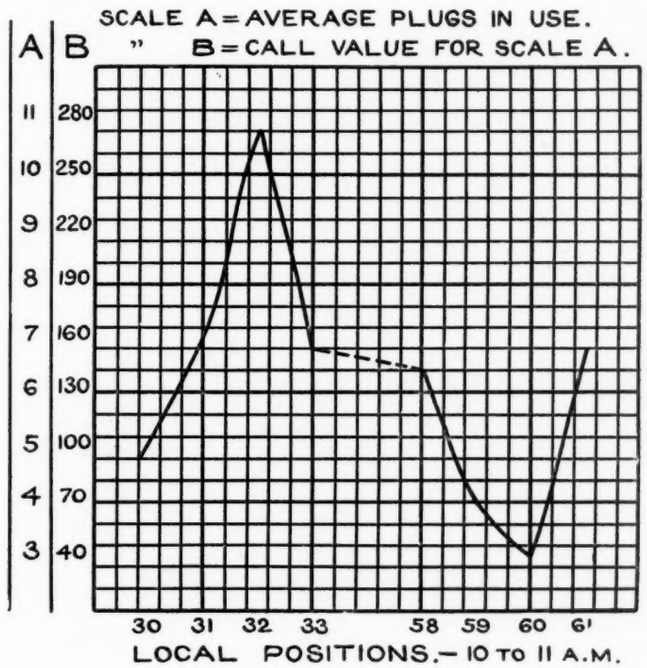


Figure 2.

distribute the operators and load so that at all times each operator shall be in the best possible position to handle her own subscribers and to help her neighbors, and to keep within the attention standard.

The question as to whether these standards are correct is open to discussion. If the second be too high the first cannot be attained. For the purposes of this paper we will assume they are correct. But I do not wish to convey the idea that main exchange valuation is correct. I will show, later, evidence that it is not so.

I will now proceed to discuss in their order the four main points previously mentioned.

(1) *The Actual Traffic.*—This is supposed to be obtained from the usual quarterly record, prepared for statistical and other purposes, the results of which are published in book form and sent to the various districts. This record is taken on one day and is necessarily left very much in the hands of the operators. Now this does not give sufficiently accurate results for our purpose, for while it may be fairly

correct in the aggregate, in detail it will be found to vary very considerably from the real facts of the case. There are many ways of getting at the truth. In Belfast, an exchange with about 40 positions, I recorded each individual subscriber's calls for one complete day (8 a. m. to 8 p. m.) by means of two specially engaged recorders, checked by selected operators. The operators recorded in half hours while the recorders made one continuous record for the twelve hours. The operators' records were 3.6 per cent less than the recorders'. The recorders were coached for six weeks previously to taking the actual record, and their results were taken as accurate. Such a record for Manchester would take too long and I have taken a shorter method which I will try to explain. It is based on the average number of plugs in use for any stated period and the average duration of the subscriber's calls. Now to get the latter figure accurately would require some thousands of stop-watch observations, and this again would take more time than I have at my disposal, so I have fallen back on a double record expedient. First of all a count was taken of the plugs in use on each position every five minutes during one day by independent recorders, and from these an average figure representing the number of cords in use for each hour for each position was obtained. It doesn't really matter at present what value in calls this represents, so long as it gives a comparative value for each position (Figure II). You will see by the figure that the values range from 2.9 to 10.6 in the hours 10 to 11 a. m. I have only shown a few positions on the figure—a busy group and a fairly quiet group—but each containing the highest and lowest value for the exchange respectively.

The next step was to get an actual value for these comparative values, so as to show which positions were too heavily loaded and which were too lightly loaded. This was done by taking eight positions and recording each subscriber's line by a special recorder (the operators keeping a peg count in half hours), and a plug count being taken at the same time each five minutes as before. In this way we get a sample of the exchange whose actual call value we know and whose plug value we also know. We can now draw a curve (Figure III) which will give a call value for any particular plug value. In recording the "samples" the operators' peg record is only used for checking purposes. No comparison takes place between the various counters. This is most important. Having found a call value, we can now set up a second scale in Figure II (scale B), and we immediately get the call value for each position in the exchange.

These results do not come out quite regular, but by tabulating all the results the correct figures will be approximately arrived at. You will see later, when we are discussing the distribution, that with good team working a variation of, say, 10 per cent to 15 per cent in individual positions doesn't matter. In the present case 64 position-hours were tabulated, and the general figures approximated to the curve shown on Figure III.

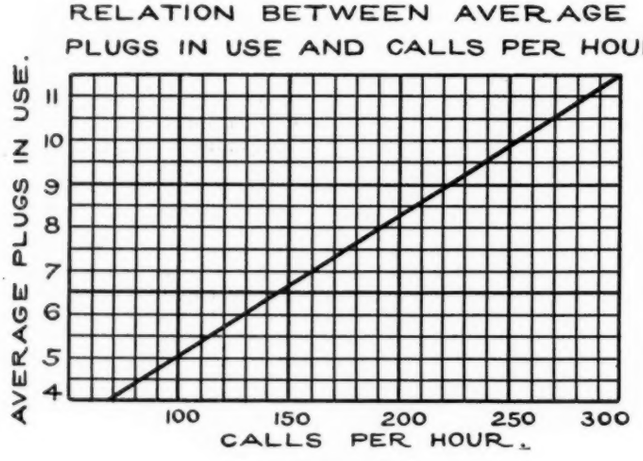


Figure 3.

We can now apply the scale B (Figure II) to the whole exchange, and so get a fairly accurate knowledge of the daily load.

(2) *The Value of the Load* depends upon the time required to make connection from one subscriber to another. The main exchange valuation, before referred to, is not any real help. They allow one call for any local connection and two for any junction. This is over value for some exchanges and under value for others.

If it be allowed that the call from an unlimited rate subscriber to any subscriber who can be called from the multiple without bringing into use any special apparatus is the call which takes the least labor and time, that call may be taken as a standard and can be represented by unity.

From the standard comparisons can be made to determine the value of every other sort of call which passes through the exchange. The valuation of the load depends, then, on purely local circumstances.

To make this clear I have prepared a table showing the different circumstances which affect the values at Manchester, Belfast, and a central battery exchange (see Table I). The information concerning central battery exchange is second hand, so I cannot vouch for its accuracy, but it will serve as a good illustration of the point under consideration.

TABLE I.

		Manchester (ring through.)			Belfast (self-restoring indicator.)			Central Battery Exchange.		
		Service.	Value.	% of total calls.	Service.	Value.	% of total calls.	Service.	Value.	% of total calls.
Destination of call.		Flat, party lines, outgoing junction to Post Office	1	99	Flat, message rate	1	86	Flat, message rate, party lines, Post Office	1	88
					Party line	2	10			
		Message rate	2	1	Outgoing junction to Post Office	3	4	Outgoing junction	2	12
Original call.	Value of 100 calls—									
	From flat rate	..		101	..		118	..		112
	From party rate	All commuted rate		101	Message rate		206	Metered or commuted		112
	From message rate	Record and auto box		202	Record and auto box		236	Metered		112

On the face of it this would appear to show that 100 calls on a common battery board are of greater value than on Manchester board. The explanation of this seeming anomaly is in the design. Each of these three exchanges is valued on its own standard, but the three standards would be of very different values, that of Manchester probably being the highest.

(3) *The Work Capacity of the Operator.*—This, as before stated, is set down by main exchange at 100 calls per half hour per operator (valued). Some few years ago it was set down as 90. Why it was changed I don't know. Improved apparatus and possibly the tendency of operators to over-record may both have had something to do with it, the records showing that the 90 calls per half hour was frequently considerably exceeded.

The standard is supposed to represent the average capacity; but, taking in the whole operating staff, from the first senior girl to the last joined half-timer, I have not found the average to come up to this standard. Taking the two busiest half hours in the morning on the day on which I took the plug count, the calls for the flat-rate operators

averaged 81 per operator per half hour, or taking the operators' own figures for the last quarterly record the average was 88. The operators dealing with these calls were twenty-four seniors and forty-seven juniors, twenty of whom had under one year's service. To get a fair average figure for all operators it is necessary to take these new operators into consideration, and if we look for half the standard amount of work from them we are expecting probably quite as much as we shall actually get. To show what this means to the rest of the staff I have deducted 50 calls per operator for these twenty operators. This gives for the efficient staff an average of 103 calls per half hour. This is a more reasonable way of looking at it than lumping the whole staff together and fixing a standard average. Different staffs have different proportions of inefficient staff, and in some towns the class of employe is better than others. Here again we have local conditions creeping in.

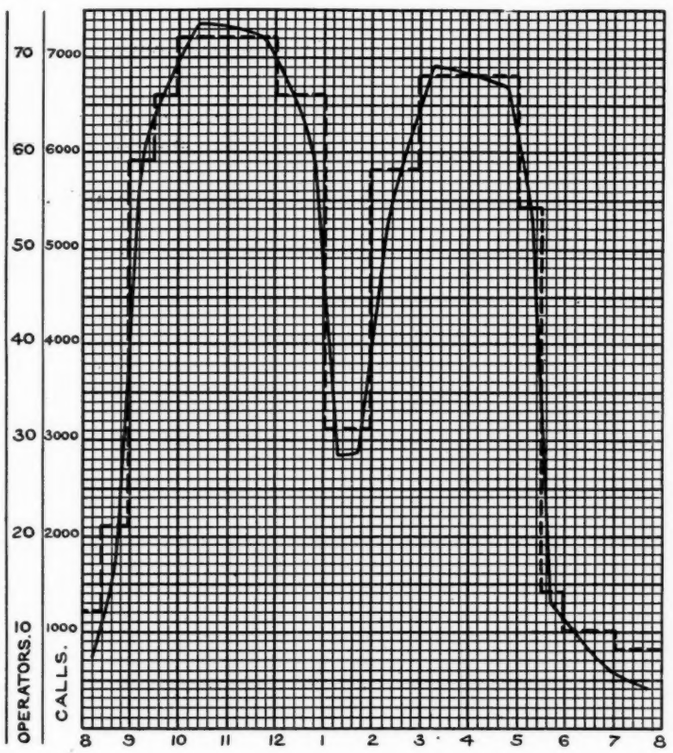


Figure 4.

We will now assume that we have definitely decided the work capacity of the whole staff, and as I have been dwelling on Manchester, let us suppose that we have decided that the average work capacity of the Manchester efficient operators to be 100 calls per half hour, and that we consider it safe to work up to that figure. We have now so to arrange the work that under all the varying conditions of the day each operator will be in a position to receive and properly handle her proper share of work.

(4) *Distribution of Load and Arrangement of Operators.*—The first step is to find the total load per half hour and plot the result on squared paper. Then, having done this, build up another curve on the same sheet, following as nearly as possible the first curve, using 100 calls as the unit in the first place and one operator as the unit for the second; the two curves are of somewhat different character, the calls curve, advancing or diminishing by one-hundredths of units in a fairly even manner, is represented by a continuous line drawn from point to point, which points represent the aggregate calls for the particular half hour in which they appear. The operator's curve, advancing or diminishing by whole units, is shown as a dotted line following the squares of the paper.

I said just now that the second curve should follow closely the first. This is theory. In practice it is not wise to follow too closely. Take the first half hour on the curve (Figure 4), you will notice a much larger proportion of staff on than would cover the 100 calls per operator. This is due to the difficulties under which they now work. Each operator has a number of positions to operate, she has to walk about from position to position instead of having everything at her finger-ends. The adverse conditions diminish as the load increases and each operator's area gets smaller and smaller, and you will notice that by full-load time it has disappeared. After the peak is passed it is not wise to commence to draw off at once, because the operators are beginning to tire and team working would be interfered with to some extent. Usually no reduction is made until twelve o'clock. From twelve o'clock to three the dinners are arranged, and at three o'clock the full afternoon staff is on duty and an effort should be made to maintain this full staff until at least five o'clock.

From this chart we get the number of operator-hours required and thus the number of operators. Table II shows a good working basis for the arrangement of the staff. Main exchange lays down the rule that all junction, party line, and message-rate positions shall be worked by seniors, and also that one out of each group of three local positions shall be a senior.

Table II.

Rank.	Positions.
Clerk-in-Charge ...	
Supervisors.....	One for each 9 operators' positions.
Record Operators...	As required.
Senior Operators...	One for each junction, party line and message rate position. One for each section of three positions for local subscribers. Reliefs for holidays and sick absence as required.
Junior Operators....	One for each remaining local position. Reliefs for holidays and sick absence as required.
Learners.....	About 5 per cent. or 6 per cent. of total staff.

You will notice that there are more operators than positions. The excess operators provide for holidays, absences for sickness, etc.

The final arrangement of the operators' times of duty and positions at the board calls for a considerable amount of ingenuity. At almost every point there are difficulties. Some of the main features are as follows:

(1) The day of eight hours should be in two equal parts of four hours each. Anything over four hours is too long for an operator to sit at one time.

(2) Each operator must work the same number of hours.

(3) Each operator in each class must take each duty in turn.

(4) There must be a just proportion of seniors and juniors on duty at each half hour.

(5) Certain positions are the right ones to work from at very slack times, and certain positions are the right ones to leave open at less busy times.

(6) Positions should not be changed when avoidable during a spell of duty.

To discuss each of these items would take up too much time, so I will shortly explain a system at present working which fulfills all these conditions. First, however, I will try and show some of the general rules of procedure in filling the positions and the arrangement indicated will hold good for the busy hours of morning and afternoon. Select certain junior positions equal in number to the difference between the morning and afternoon staff and load these to

half load; let these positions be occupied in the morning by the later juniors (B), and in the afternoon let them be vacant, using the operators for these positions in the room which will be left vacant by other operators who work split duties, to provide for late duties. These positions should be selected with a view to spreading out the extra work as far as possible. Where there is one unbroken line make them equidistant. Manchester is a peculiar example. There are four separate lines of operators, giving eight end positions. Considering one line only, the proper place for the vacant position would be in the middle; but here we have to consider the two sides of the multiple, and to have two vacant positions opposite to each other would increase the drawbacks, so we place them a little out of the center in each case and in opposite directions.

Table 3.

DUTIES			POSITIONS		
No.	ON OFF	ON OFF	A.M.	P.M	
1	10 – 2	6 – 10	5B	12B.	SENIOR
19	9 – 1	2 – 6	6A	5B.	GOOD JUNIOR
45	9 – 1	2 – 6	6C.	6A.	LESS EFFICIENT JUNIOR

Next select the senior operators for the local positions, one for the center position of each group of three. Put very good operators next to the half-load positions. Then put an efficient junior at each section, observing the same caution of selecting a very good one next to the half-load position as in the senior. This leaves one position at each section for the less efficient juniors.

Having arranged these take each group of three and weigh its merits. Some groups can be called good and some only fair; don't let the "only fair" groups be adjacent to each other.

The Belfast duty sheet which is one I am going to describe fulfils all the conditions previously mentioned, viz.—

(1) No operator works more than four hours at a stretch.

(2) Each operator works 45 hours per week.

(3) Each operator in each class takes each duty in turn.

(4) Seniors and juniors having separate duty lists, there is always a just proportion of both on duty.

(5) The positions changing with the duties, the same positions are opened and closed automatically each day at the same time.

(6) For the same reason the minimum number of changes takes place during the spells of duty, and these are automatic, and the same changes, which are the necessary ones, take place every day.

Table 3 is a portion of the duty sheet. You will see by this that operator *1* does a split duty, and so is away during the afternoon. Her position being one that cannot be closed, the good junior from *6a* takes her place from two to six; *6a* also is a position which cannot be closed, so the less efficient junior from *6c* takes *6a; 6c*, being a half-loaded position and suitable for leaving vacant in the afternoon, is closed.

There is just one other point I wish to mention, and that is design. End positions are things to be avoided on subscribers' sections; they are affected in the same way that a vacant position affects adjacent positions. This checks the speed of answer, and slow calls must be looked for and guarded against by careful distribution. It is estimated that an operator on end positions loses about 20 per cent efficiency.

In an exchange of good design there would only be two end positions, the total loss in efficiency being only 40 per cent of one operator's capacity.

Taking Manchester with 72 positions, this would only mean .5 per cent loss per position, not a serious matter. But with the present design there are eight end positions, which means 160 per cent operators' capacity loss, or 2.2 per cent per position.

A TIP TO TELEPHONISTS.

Mayor Brush, of Mt. Vernon, Ohio, who extablished a municipal ice plant, was congratulated on this plant the other day, and Mayor Brush answered, says the Electrical Times:

"Corporations and monopolies are very powerful things, but, one way or another, it is always possible to get just treatment from them.

"I have a friend, Whiting, who is the victim of a telephone monopoly. In his town there is only one company, the rates are high, and the service is poor.

"Whiting's telephone got out of order. Sometimes it would work and sometimes it wouldn't. It needed attention, and Whiting said so repeatedly, but the company wouldn't do anything for him but send him a bill promptly at the month's end, and the telephone remained in a very unsatisfactory state.

"Finally Whiting put his brain to work on the problem of getting his telephone repaired, and the next time he was called up, taking down the receiver, he said mildly:

"'Hello.'

"'Hello,' was the reply. 'Is this Whiting?'

"'No,' said he.

"'Isn't this No. 713-A?'

"'No, indeed. It is 872-B, Mrs. Cora Thompson.'

"'Oh, excuse me.'

"Whiting smiled and returned to his work. A minute or two passed and he was called up by a feminine voice—the proud, haughty voice of the young lady at the exchange.

"'No. 713-A, isn't it?' she said.

"'No, no,' said Whiting.

"'Isn't this Mr. Whiting?'

"'No. It is Harry Smithers.'

"'What is your number?'

"'Why, 1192, of course.'

"'Oh.'

"Silence. Then a minute later the telephone girl rang again.

"'Hello. No. 713-A? Mr. Whiting?' she said.

"'No,' Whiting answered in a surprised tone. 'This is No. 321-A.'

"'Oh.'

"Five minutes' pause. Then:

"'Hello. No. 713-A?'

"It was a man's voice, the manager's. Whiting, smiling grimly, answered it.

"'No. This is the Globe theater.'

"There was an angry mutter over the wire, and half an hour later a foreman and six assistants, armed with all kinds of batteries and tools, invaded Whiting's office. When they left the telephone's defect had been repaired, and it was, for the first time in six months, in perfect condition."

Considerable progress is being made in the construction of telephone lines in Egypt, and during the past year 850 lines will be completed. There are at present 1,036 lines open, 457 of which were added during the last year.

PROGRESS OF THE MONTH

Compiled by H. A. Downey

NEW COMPANIES

GRAFTON, N. D.—The farmers west of this city are forming an Independent telephone company.

BERESFORD, S. D.—The North Star Telephone Company has been incorporated with a capital stock of $25,000.

COMSTOCK, Neb.—The Comstock Telephone Company has been incorporated, with a capital stock of $10,000.

RICH HILL, Mo.—The Happy Hill Telephone Company has been incorporated to construct a telephone system.

CANTON, Kans.—Articles of incorporation have been filed for the Canton Telephone Company of this place.

LANSFORD, N. D.—The First Farmers' Telephone Association has been incorporated with a capital stock of $14,000.

LITTLE FALLS, Minn.—A farmers' telephone company has been organized to construct a line from Little Falls to Royalton.

BERESFORD, S. D.—Articles of incorporation have been filed for the Pleasant Telephone Company with a capital stock of $10,000.

LOST NATION, Ia.—A new Independent telephone company is being organized at this place. Among those interested in the project is H. B. Acott.

HASTAIN, Mo.—The Hastain Telephone Company has been organized and incorporated by the following: I. W. Stetson, G. S. Hart and G. P. Howell.

CRISFIELD, Kan.—The Crisfield Telephone Company was organized recently for the purpose of constructing a telephone line between Crisfield and Attica.

WILSON CREEK, Wash.—At a recent meeting of the stockholders of the Wilson Creek Telephone Company it was decided to incorporate with a capital stock of $2,500.

MOAB, Utah.—The Blue Mountain Telephone & Electric Company has been organized for the purpose of building a telephone line into Bluff City and Indian Creek.

MENDOTA, Va.—The Mendota Mutual Telephone Company has been incorporated with the following officers: President, C. O. Johnson; vice-president, G. W. Hendricks.

BELLINGHAM, Wash.—The Laurel Sunset Company has been organized at Laurel and will construct a telephone line to this city. W. L. Chandler is president of the company.

HIGHLAND, Kans.—The Highland Telephone Company has been organized with the following officers: President, Gus Foreman; secretary, Frank Hubbard; treasurer, J. M. Neills.

ROCK ISLAND, Ill.—The Simpson Mutual Telephone Company has been incorporated, with a capital stock of $2,000. The incorporators are John R. Harper, Milo Austin and J. J. Murrie.

SHELBYVILLE, Ky.—The Shelby County Telephone Company has been incorporated with a capital stock of $120,000 by W. J. Thomas, B. A. Thomas, E. J. Doss, J. C. Burnett and others.

GENEVA, Kans.—The Geneva Rural Telephone Company has been organized with the following officers: President, C. L. Knowlton; treasurer, D. D. Spicer; secretary, George Tippon.

SYLVESTER, Ga.—The Sylvester Telephone and Telegraph Company has been incorporated with a capital stock of $2,500 by T. A. Spurlin, Mrs. Joseph Spurlin, J. G. McPhaul, and others.

MARFA, Tex.—A company has been organized in this place with a capital stock of $20,000 to install an electric light, ice and telephone plant. Orders have been placed for the equipment.

RANTOUL, Ill.—The Coon Brothers Telephone Company has been incorporated, with a capital stock of $60,000. The incorporators of the company are James S. Coon, Edmond G. Coon, Rose O. Coon.

MARFA, Tex.—The Marfa Power Company has been incorporated with a capital stock of $3,500 by W. F. Mitchell, Charles S. Murphy, and L. C. Britt for the purpose of constructing a telephone system.

NEW ATHENS, Ill.—The Eastern Farmers' Telephone Company has been incorporated with a capital stock of $400. The incorporators of the company are: Henry Kaiser, George Irwin and R. Q. Haupt.

RICH HILL, Mo.—The Hickory Hollow Telephone Company of Rich Hill has been incorporated with a capital stock of $500. The incorporators are Grant Stine, J. L. Gander, C. F. Kienberger, and others.

WAHL, Wash.—Articles of incorporation have been filed for the Silver Lake Telephone Company, with a capital stock of $2,000. The incorporators are: George Hemni, T. B. Jones, and Richard Kohler.

NORTHFIELD, Minn.—The Northfield Telephone Company has been incorporated, with a capital stock of $25,000. The incorporators of the company are as follows: William Ebel, D. D. Turner, and A. L. Dixson.

TELL CITY, Ind.—The Citizens' Telephone Company has been incorporated, to operate a telephone system in Tell City. The directors of the company are John Sweeney, Frank J. George and Vincent Smith.

TRUMANSBURG, N. Y.—The Trumansburg Citizens' Telephone Company has been incorporated, with a capital stock of $5,000. The incorporators are: R. J. Hunt, Trumansburg; W. J. Garvey, E. B. Rogers, Elmira.

MASON CITY, Ill.—The Mason City Telephone & Telegraph Company has been incorporated, with a capital stock of $2,500. The incorporators of the company are as follows: W. A. Grandy, J. F. Culp, and H. F. Reason.

PONTIAC, Ill.—The Livingstone County Home Telephone Company has been incorporated with a capital stock of $200,000. It is the purpose of the company to construct, maintain and operate telephone and telegraph lines.

SCOTTSVILLE, Ky.—The Scottsville and Liberty Telephone Company of this city has been incorporated with a capital stock of $160. The incorporators of the company are E. H. Reynolds, D. N. Reynolds, J. W. Whitlow.

LA HARPE, Ill.—La Harpe is to have another telephone exchange soon, the Farmers' Telephone Company. All the country lines will connect with the new exchange. Many business men and others are interested in the enterprise.

HERRICK, S. D.—Articles of incorporation have been filed for the Rosebud Telephone Company, with a capital stock of $25,000. The incorporators of the company are M. F. Slaughter, Gregory; G. N. Venvery, Lucius Leslie, Naper, Neb.

CASEY CREEK, Ky.—The Casey Creek & Merrimac Telephone Company has been incorporated, with a capital stock of $220. The incorporators of the company are as follows: R. L. Beard, J. S. Beard and George Gilpin, all of Casey Creek.

CASHION, Okla.—Articles of incorporation have been filed for the Mt. Zion Rural Telephone Company, with a capital stock of $2,000. The incorporators of the company are as follows: D. M. Gilbreath, F. H. Smith, and T. G. Abercrombie.

NEW YORK, N. Y.—The United Electric Service Company has been incorporated with a capital stock of $5,000 to operate telephone and telegraph lines. The incorporators are M. W. Rayens, J. T. Mulhall, J. T. Delaney of New York City.

RENTON, Wash.—Articles of incorporation have been filed for the Renton Independent Telephone and Telegraph Company with a capital stock of $10,000. The incorporators of the company are as follows: A. T. West, E. L. Heath, and Peter McRae.

CHALMERS, Ind.—The Chalmers Telephone Company, White county, has been incorporated with a capital stock of $10,000. The incorporators are J. C. Chamberlain, A. G. Fisher & Son, Ross, Ross & Barr, R. V. Anderson, M. O. Raub, and C. E. Smith.

CARROLL, Neb.—A new telephone company has been organized by John Heeren, John Shannon, R. D. Merrill, and J. W. Johnson for the purpose of establishing a telephone system at this place. It is to be an incorporated stock company with $10,000 capitalization.

OMAHA, Neb.—The Independent Telephone Company has been incorporated in this city, with a capital stock of $2,000,000. The incorporators are as follows: T. E. Parmele, T. H. Pollock, Stockton Heath, W. C. Bullard and F. W. Judson.

CLEVELAND, O.—The Ohio Electric Specialty Company has been incorporated, with a capital stock of $20,000. The incorporators of the company are as follows: P. C. Greenwall, F. C. Hackett, Walter S. Lister, Elizabeth Lewis, L. M. Henders.

VERMILLION, Alb., Can.—An effort is being made to incorporate the Alberta Power, Light and Supply Company to supply electricity and to carry on a general telephone business. The name of H. V. Fieldhouse is mentioned in connection with the enterprise.

COLUSA, Calif.—Articles of incorporation have been filed with the county clerk by the Colusa County Telephone Company to operate a telephone system in this county and construction work will be commenced at an early date. The incorporators of the company are A. S. Lindstrom and C. L. Donohoe of Willows, J. F. Campbell of

Maxwell, C. L. Schaad and G. C. Comstock of Willows, J. Morris Jones, W. T. Rathbun, Ernest Weyand and Oscar Robinson of Colusa.

GREENFIELD, Ind.—The Westland Telephone Company, of Westland, Hancock county, has been incorporated, with a capital stock of $260. The directors of the company are J. F. Coffin, W. H. Power, Levi Gulley, Henry Cobb, John S. Curry and R. B. Binford.

MANGUM, Okla.—The Independent Mountain Telephone Company has been incorporated, with a capital stock of $5,000. The incorporators of the company are: J. T. Dr. Arman, J. R. Crook, and J. R. Harris of Willow, W. W. Boyd and B. F. Waggoner of Jester.

ASHTABULA, O.—A new Independent rural telephone company has been organized in Williamsfield township and incorporation papers have been applied for. The officers elected by the new company are as follows: President, Dr. N. C. Satterlee; secretary, Will Nesbit.

FOUNTAIN, Mich.—A farmers' telephone company will be organized for the purpose of installing a telephone system in this vicinity. A temporary organization has been effected, with the following officers: President, Henry Eoff; secretary, Sam Burns; treasurer, Del Manchester.

PECKHAM, Okla.—The Air Line Mutual Telephone Company has been incorporated, with a capital stock of $225. The incorporators of the company are as follows: Col. Lockwood, C. H. Cunningham, James E. Howarth, and H. P. Maus of Newkirk and Frank Coffeen of Peckham.

MARLINGTON, W. Va.—The Appalachian Pole Company has been organized with the following officers: President, E. M. Arbogast; secretary-treasurer, J. Ed. Arbogast; general manager, A. W. Arbogast. It is the purpose of the company to buy and sell telegraph telephone and trolley line poles.

NAVASOTA, Tex.—The Washington-Navasota Telephone Company has been incorporated with a capital stock of $750 for the purpose of constructing a telephone line in Grimes, Brazos, and Washington counties. The incorporators of the company are H. C. Lende, Gus Stulz, J. W. Brosig, and others.

CORYDON, Ind.—The Harrison County Farmers' Telephone Company has been incorporated with a capital stock of $5,000. The directors are as follows: T. J. Stevens, Crandall, Ind.; C. B. Anderson, Corydon; D. C. Curvis, New Salisbury; John Gluitz, Corydon; Louis P. Wagner, Crandall.

MADISON, Wis.—Articles of incorporation have been filed with the secretary of state for the Valley Telephone Company of Buena Vista, Portage county, with a capital stock of $1,000. The incorporators of the company are as follows: D. F. Gates, L. E. Wentworth, H. H. Rood and J. W. Boursier.

WALKER, Ia.—A new company, known as the Farmers' Mutual Telephone Company, has been incorporated and a petition is now being circulated asking the mayor to call a special meeting to submit the proposition of granting the company a franchise to do business within the corporate limits of Walker.

MODESTA, Cal.—A Farmers' Telephone Company has been organized at this place and the work of constructing a telephone system will begin at once. Among those interested in the enterprise are the following: Frank Gomez, H. L. Thompson, E. F. Hutchings, Frank Goodwin, and W. H. Palmer.

SUTTONS BAY, Mich.—The East Leland Telephone Company has been organized with the following officers: President, S. E. Blackwood; vice-president, Dr. J. F. Slepica; secretary, Ed Steffens; treasurer, Philip Egeler; directors, Henry Kahrs, Philip Poertner, William Spinniken, Theodore Each, Eli Firestone.

MIDDLETOWN, Ill.—The Middletown Mutual Telephone Company has filed for record with the county recorder, articles of incorporation. The articles show capital stock of $2,500 and the number of shares 125. The incorporators of the company are as follows: J. C. Lloyd, P. J. England, Thomas Dorgan and Louis A. Buckner.

LEXINGTON, Neb.—The Dawson County Mutual Telephone Company, operating exchanges at Lexington and Eddyville, with connecting lines between, has filed articles of incorporation in the secretary of state's office. The capital is placed at $3,000 and the incorporators are Nick Kopf, R. Birth, D. Campbell, J. A. Wolford, A. J. Watkin.

CHICAGO, Ill.—The Tenney-Ingraham Company has been incorporated with a capital stock of $10,000. The incorporators of the company are as follows: Frank P. Schmidt, Wallace A. Walker and William G. Wise. It is the purpose of the company to manufacture electric apparatus and operate electric light and telephone systems.

CANAL DOVER, O.—The farmers in the vicinity of Winfield are organizing a new Independent telephone company to be known as the Dover-Winfield Telephone Company, which has for its purpose the construction of lines from Winfield to Canal Dover, at which point connections will likely be made with the Tuscarawas County Telephone Company. The officers of the company are as follows: President, O. S. Welty; secretary, J. E. Richardson; treasurer, Fred Espenschied.

CANNELTON, Ind.—The Citizens' Telephone Company, recently organized, has been incorporated with a capital stock of $10,000. The officers of the company are as follows: President, L. C. Lasher; secretary, John Malone; treasurer, James Graves; directors, George Mann, Vincent Smith, John Moutschka, Jr., Tobias Simon, August Kahlbrier.

KLINESVILLE, Pa.—An Independent Telephone Company has been incorporated at this place by the following: A. Greenawalt, Kempton; D. P. Berk, Albany; W. Kunkel, A. D. Kunkel and others of Klinesville. The company is building lines between Klinesville and Kempton and intends eventually to connect with Trexler, Wanamaker, Steinsville, Jacksonville and Lynnport.

HYDEN, Ky.—The Pine Mountain Telephone Company has been incorporated, with a capital stock of $3,500. The incorporators of the company are as follows: H. S. Eversole, W. D. Feltner, and Thomas L. Gabbard, of Hyden, and James H. Jeffries, of Pineville. It is the purpose of the new company to construct a telephone line from Hyden, Leslie county, to Pineville, Ball county.

LORTON, Va.—The Lorton Telephone Company has been incorporated, with a capital stock of $5,000. The incorporators of the company are: Howe Totten, president; D. Morgan, William R. Ward, F. H. Elmore, B. O. Holt, all of Fairfax county. The purpose of the company is to construct a telephone line 100 miles long in the counties of Prince William, Fairfax and Alexandria.

CHICKASHA, I. T.—An Independent telephone company to be composed entirely of home people is being organized here for the purpose of putting in a modern telephone system. Chickasha has been badly served in the past two years in the way of telephone service. It is proposed to ask the city council for a franchise and to put in the most up-to-date system obtainable, with underground cable.

GRASS VALLEY, Cal.—The Clear Creek farmers have organized a telephone company for the purpose of connecting with this city, and will at once begin construction work. The officers of the company are as follows: President, E. B. Odell; vice-president, W. T. Williams; secretary, Mrs. L. Black; treasurer, Thomas Loney. The people of Chicago Park also contemplate the construction of a similar line.

DAYTON, Ia.—Articles of incorporation have been filed at the county recorder's office for the Dayton Mutual Telephone Company. The company is capitalized at twenty-five thousand dollars. The directors have bought out the Farmers' Mutual Telephone Company and are planning to extend the system. The directors of the new company are Messrs. H. E. Nelson, Charles Pearson, S. A. Burnquist, J. W. Greene.

KNOWLTON, N. J.—Articles of incorporation have been filed by the Delaware & Belvidere Telephone and Improvement Company with a capital stock of $2,000. The incorporators of the company are as follows: C. J. Quigg, F. Brisbane, M. C. Allen, G. J. Prah, J. E. Albertson, J. H. Albertson, and L. R. Keineuour. It is the purpose of the company to construct telephone and telegraph lines in the state of New Jersey.

MOORE'S HILL, Ind.—An Independent telephone company to be known as the Moore's Hill Telephone Company has been organized by the business men of this place. It is the purpose of the company to install an up-to-date exchange in this place and lines will be built to the surrounding country. The company will have connection with the Southern Indiana Telephone Company on the east and the Osgood Telephone Company on the north and west.

COOPERSTOWN, N. D.—The Griggs County Telephone Company has been incorporated, with a capital stock of $50,000. The directors of the company are as follows: David Bartlett, Joseph Buchheit, Geo. H. Condy, Chas. Burseth, M. D. Westley and A. Goff. As soon as the certificate of organization is received from the secretary of state the officers will be elected. The company which is composed of some of the best business men of the county recently purchased the local telephone system owned by A. Goff. Improvements will be made in the system.

WORCESTER, Mass.—Articles of incorporation have been filed with the Secretary of State for the Worcester County Telephone Company. The company starts with a capital of $5,000, which amount, however, is nominal, as the capitalization is to be considerably increased later. The new company is in no way connected with the Citizens' Telephone & Telegraph Company, which some time ago petitioned the board of aldermen for a franchise, but apparently abandoned the matter. The officers of the company, as shown by the articles of incorporation, are as follows: President, William H. Cook, who is treasurer of the George C. Whitney Manufacturing Company; vice-president, Richard Healy; treasurer, Charles F. Marble; clerk, Alexander H. Bullock; directors, the above officers and Paul B. Morgan, Alonzo B. Whitcomb and Samuel E. Winslow.

CHEYENNE, Wyo.—A certificate of incorporation has been filed for the Jackson Valley Telephone Company by S. N. Leek, Abra-

ham Ward, J. A. Adams, Fred Lovejoy and W. W. Smith in the office of the secretary of state. The object of the corporation is to construct, operate and maintain telephone lines in Jackson Valley and surrounding country; to acquire title to such real estate and personal property as may be necessary in the conduct of a telephone business, and to do any lawful act to promote the welfare of the company. The capital stock of the company shall be five thousand dollars, divided into two hundred shares of a par value of twenty-five dollars per share, fully paid and non-assessable. Five trustees shall conduct the affairs of the company for the first year and they are as follows: S. N. Leek, Abraham Ward, J. A. Adams, Fred Lovejoy and W. W. Smith. The principal place of business is Jackson, Uinta county, Wyoming.

ELECTIONS AND MEETINGS

PROLE, Ia.—The telephone company of this place recently held its annual meeting and elected the old trustees for the coming year.

BLANCHARD, Ia.—At a meeting of the Blanchard, Coin and College Springs Telephone Company R. A. Sales was elected secretary and director of the company for the next two years.

HAMILTON, Mo.—The Home Telephone Company has elected the following officers: President, J. S. Jewell; vice-president, C. W. Wright; secretary, C. A. Metz; treasurer, John Whitelaw, Jr.

REYNOLDS, Ill.—The Reynolds Telephone Company at a recent meeting elected the following officers: President, M. Schoonmaker; directors, Frank Keim, George Olson, W. G. Haefele, J. B. Vance.

CUBA, Ill.—The Cuba Central Telephone Company has elected the following officers: President, W. L. Shurtleff; secretary-treasurer, M. E. Scott; directors, O. R. Grady, N. A. Rowden and J. Beam.

GREENSBURG, Ind.—The Decatur County Independent Telephone Company has elected the following officers: President, C. P. Miller; vice-president, Morgan L. Miers; secretary, Thomas E. Davidson; treasurer, J. H. Christian.

NEW LONDON, Ia.—The Henry County Telephone Company has elected the following officers for the ensuing year: President, W. Francy; vice-president, J. E. Peterson; secretary, A. D. Hayes; treasurer, V. H. Shields.

GAINESVILLE, Fla.—It is the intention of the East Florida Telephone Company to extend its lines as far south as Tampa and St. Petersburg, and when this work is completed lines will be constructed towards the west.

JOPLIN, Mo.—The Home Telephone Company has elected the following officers: President and manager, Theo. Gary, Macon, Mo.; vice-president and assistant manager, A. F. Adams, Joplin; secretary and treasurer, R. W. Frey, Joplin.

CLARINDA, Ia.—The Farmers' Mutual Telephone Company has elected the following new officers: President, William Wehmiller; vice-president, Thomas Winger; secretary, Frank Brokaw; treasurer, J. H. Wagoner; director, E. Fleenor.

DEER CREEK, Minn.—The Deer Creek Telephone Company recently incorporated, with a capital stock of $25,000, has elected the following officers: President, Harold A. Baker; vice-president and treasurer, Arthur D. Baker; secretary, John C. Smith.

MABEL, Mo.—At the annual meeting of the Mabel Telephone Company the following officers were elected: President, A. J. Metcalf; treasurer, Richard Hudson; secretary, F. H. Blackburn; directors, D. S. Brooks, J. A. Logue and the above officers.

CANNONSVILLE, N. Y.—The Cannonsville Telephone Company has elected the following officers: President, Charles K. Liddle; vice-president, B. S. Boyd; secretary, Austin Owens; treasurer, Howard Huntington; directors, Charles Watson, George Seymour, George Keeler.

IOWA CITY, Ia.—The Johnson County Telephone Company has elected the following officers: President, A. T. Averill, Cedar Rapids; vice-president, S. W. Mercer, Iowa City; secretary and treasurer, Jay Chatham, Iowa City; directors, A. T. Averill, G. M. Averill, H. N. MacDonald, Jay Chatham and S. W. Mercer.

JACKSON, Mich.—Fifty managers of the Independent telephone companies of the state recently held a meeting in this city and organized a state association with the following officers: President, F. G. Newman, Grand Rapids; vice president, William Robinson, Muskegon; secretary and treasurer, H. T. Clough, Owosso.

OXFORD, N. Y.—The annual meeting of the Oxford and Gifford Telephone Company was held at Coventry Station and the following officers were elected for the coming year: President, Ward B. Gifford; secretary and treasurer, Jesse Jacobs; collector, Bert Northrup; directors, Tracy T. Cone, D. S. Marshman, F. J. Race.

ASHTABULA, O.—A meeting of the stockholders of the Madison Telephone Company, operating lines between Ashtabula and Painesville, and forming the connecting link between Ashtabula and Cleveland, was recently held in this city. The report of the condition of the company was most favorable, showing a profitable year's business. After the election of directors and the declaring of a semi-annual dividend of 3 per cent, the directors elected C. W. DeVoe president for the coming year. The company is one of the strong institutions of the county and has regularly declared semi-annual dividends.

SPRINGVILLE, N. Y.—At the annual meeting of the stockholders of the Springville Telephone Company officers were elected as follows: President, M. N. Brooks; secretary, H. Taylor; treasurer, I. H. Vail; general manager, F. H. Bruce; directors, M. N. Brooks, F. H. Bruce, G. W. Gillett, J. W. Smith, I. H. Vail, H. Taylor and W. W. Blakeley.

ASHTABULA, O.—The second annual district convention of the 22 township Independent telephone companies in Ashtabula and adjoining counties was held at Orwell recently. Preliminary arrangements were made for a toll trunk line to be built from Bloomfield to Austinburg, covering the entire width of the district and giving long-distance connections.

WEISER, Idaho.—The Central Idaho Telegraph and Telephone Company has elected the following directors: E. M. Heigho, B. L. Steeves, Lewis Hall, Frank Miller, and Frank Gribbin, all of Weiser. The officers elected are as follows: President, treasurer and general manager, E. M. Heigho; vice-president, B. L. Steeves; secretary, C. W. Webb; assistant secretary, Lewis Hall.

BELFAST, Me.—At its annual meeting the Liberty & Belfast Telephone Company voted to change its name to Liberty & Belfast Telephone and Telegraph Company and to increase the capital stock from $5,000 to $7,000. T. N. Pearson of Morrill is president; D. M. McFarland, of Montville, treasurer, and Edward Evans, of Waldo (P. O. Belfast R. F. D. No. 1), is general manager and collector.

WORCESTER, Mass.—At a meeting of the board of directors of the Worcester County Home Telephone Company, recently incorporated, the number of directors of the company was increased from seven to eleven by the election of the following from the places where applications were made for franchises in addition to the city of Worcester: Marcus Coolidge, Fitchburg; Alexander A. Paton, Leominster; Jerome S. Ames, Gardner; George W. Moss, Clinton.

EMMETSBURG, Ia.—The annual meeting of the Emmetsburg Telephone Company was held in this city recently and the old officers were re-elected for the coming year. The company has been very successful, the earnings of the plant during the past four years having more than doubled the size of the system, and the company is nearly out of debt. There are 242 telephones in service. The total amount invested by the company to date is $3,920 and the system has a market value of over $13,000.

BESSEMER, Ala.—At a recent meeting of the North Johns Telephone Company the following officers were elected: President, A. D. Thompson; secretary-treasurer, Columbus Blankenship; directors, Felix Parsons, W. P. Clapp, and Monroe Goodwin. The company is a coöperative one and sixty telephones are now in use, but it is the intention of the company to connect with Bessemer and the rest of the district at once, and a great deal of the stock is being sold. The company contemplates building to Bessemer and connecting with the People's Telephone Company.

ATTICA, Ind.—Representatives of the fourth district of the Independent Telephone Association of the state recently met in this place. Among other important matters discussed the organization passed a resolution to ask the New Long Distance Telephone Company to construct two new through lines from Lafayette to Indianapolis and one line from Crawfordsville to Indianapolis. The resolution asked that these be put in within the next four months. Unless this is done the organization will take such other steps as it may deem necessary to get the improved service.

LA GRANGE, Ind.—At the annual meeting of the stockholders of the Northern Indiana and Southern Michigan Telephone, Telegraph and Cable Company the following directors were reëlected: Dr. A. J. Hostetler, Charles E. Sears, Martin L. Johnston, and Miss A. H. Ellison. According to a report filed by the secretary and general manager, J. F. Roop, the gross receipts were $23,506.22 for the year. The company has ten exchanges in La Grange county and all the exchanges show an increase in the number of telephones in service. The general condition of the equipment of the company and its service for the year just closed is probably more satisfactory than ever before.

FORT WAYNE, Ind.—The Nine Mile Telephone Company of Nine Mile recently held its annual meeting and elected officers as follows: President, Frank P. Harber; secretary and general manager, R. H. Minnich; treasurer, Alex Cunnison. These officers, together with George Coverdale and Dr. J. R. King, constitute the board of directors. The report of the treasurer showed the company to be in a most prosperous condition and the secretary's report showed that a great deal of important work had been done during the past two years. The company has wires connecting with the Home Telephone Company's lines, and its patrons are thereby given direct connection with all Home patrons in Fort Wayne.

IRONTON, O.—Representatives of the Independent telephone interests in this district recently met in this city. Matters of mutual interest were discussed. A committee consisting of R. A. Knapp and U. T. Cox was appointed to present a plan for perfecting a permanent county organization. The committee named the follow-

ing delegates to a future meeting: R. A. Knapp, Ironton; John Banks, Burlington; U. T. Cox, Getaway; L. D. Eaton, Proctorville; Nat Burchum, Scott Town; E. M. Hamilton, Wilgus; Jno. G. Keys, Rock Camp; J. T. Vermillion, Waterloo; Elmer Massie, Lecta; Dr. L. A. William, Millers; E. L. Kitts, Kitts Hill. The committee recommended that a meeting be held some time about the first of the year.

FT. WAYNE, Ind.—At the annual meeting of the stockholders of the Home Telephone Company the old officers were re-elected as follows: President, Charles S. Bash; vice-president, John B. Ruess; secretary, W. L. Moellering; treasurer, Max B. Fisher; directors, Charles S. Bash, John B. Reuss, W. L. Moellering, Max B. Fisher, Isadore Lehmann, William Bohn, G. Max Hoffman, George T. Fox, and P. W. Smith. Of the 5,000 shares of stock 4,335 were represented either in person or by proxy. The report showed the most prosperous year of the company's history and a large increase in the number of telephones in use and the receipts. The auditing committee consists of Henry B. Freeman, George B. Loesch and H. H. Hartwig.

GRINNELL, Ia.—The annual meeting of the Interior Telephone Company was held recently and the following officers elected for the coming year: President, Harold L. Beyer; first vice-president, Chas. P. Clark; second vice-president, M. Rew; secretary, W. S. Hendrixson; treasurer, C. W. H. Beyer; directors, J. P. Lyman, J. F. Wilson. The report given by President H. L. Beyer showed the company to be in a very prosperous condition. The regular semi-annual dividend will be paid January 1. The directors were much pleased with the progress of the company under the present management. The percentage of expenses to receipts has been diminished and the net income largely increased. G. L. Saunders is manager of the company.

LOGANSPORT, Ind.—The stockholders of the local Independent telephone company recently met to hear the annual report of the secretary and elect a new board of directors. There was a full attendance and when Walter J. Uhl, manager of the local system, read his report it was roundly cheered and the manager congratulated on the showing made during the year. The reports showed that there has been a wonderful increase in the business of the local company during the last year and that efficient management has reduced operating expenses to the minimum. The old board of directors was elected with the exception of J. G. Powell, who resigned, and was succeeded by W. H. Porter. The directors will elect officers within a short time.

WILLIAMS, Cal.—The directors of the Colusa County Telephone Company recently held their first annual meeting and elected the following officers: President and general manager, C. L. Schaad; secretary, J. M. Jones; directors, W. T. Rathbun and Oscar Robinson of Colusa, J. F. Campbell of Maxwell, and G. C. Comstock and C. L. Schaad of Williams. The principal place of busineses is at Williams. The company intends as soon as possible to construct leads throughout the county and build exchanges for the towns of Colusa, Williams, Maxwell, Arbuckle, College City, Grimes, Princeton, Sites, Stonyford, Leesville, Sulphur Creek, and all rural communities between these points. It is the purpose of the company to use the latest up to date apparatus and run strictly as an Independent company.

ORDINANCES AND FRANCHISES

FREMONT, Ia.—The Farmers' and Traders' Telephone Company has been voted a franchise in Fremont.

RIPLEY, O.—A number of citizens of this place have been granted a franchise to install a local telephone system.

BRAINERD, Minn.—The city council has granted a franchise to Horace F. Mann to construct and operate a telephone system.

ALBION, Ill.—The Westfall Telephone Company has made application for a franchise to establish a telephone system at Albion.

EATON, Colo.—The Northern Telephone Company has been granted a franchise to install a telephone system in this place.

STEUBENVILLE, O.—The Phoenix Telephone Company has petitioned for a franchise to place conduits in certain streets of the city.

CARIBOU, Me.—The Independent Telephone Company has petitioned the selectmen for the right to construct its lines into this place.

OSSEO, Wis.—The Beef River Valley Telephone Company has been granted a franchise to build and maintain a telephone system in Osseo.

FULTON, Ill.—The city council in special session recently granted a franchise to the new telephone company, which is being organized in this place.

WAYNESBURG, Pa.—The Council has granted a franchise to the Greene County Telephone Company permitting the erection of its system on the borough streets.

HOQUIAM, Wash.—Edward C. Finch, who has been granted a franchise by the city council, has filed a $500 forfeit with the city clerk. This franchise during its passage was fought by the citizens of Hoquiam and was vetoed by Mayor McIntyre, but passed over his veto.

SENECA, Ill.—A farmers' telephone company from Newark is seeking a franchise to enter Seneca. A number of farmers north of this place are stockholders in the company.

MANTEO, N. C.—D. O. Newberry of Columbia, operating telephone lines in Tyrell and Washington counties, has been granted permission to construct lines in Dare county.

PIONEER, Mich.—The Hillsdale County Telephone Company has been granted a franchise and arrangements have been completed for the installation of an exchange in this place.

PADUCAH, Ky.—Mayor Yeiser has signed an ordinance fixing an annual rental of $2 per pole for all poles used in the public highways of Paducah by telegraph or telephone companies.

THORNVILLE, O.—An ordinance has been passed granting a telephone franchise to the Perry County Telephone Company of New Lexington, to operate a telephone system in Thornville.

WHEATLAND, Cal.—The board of trustees of Wheatland has received application for a telephone franchise, the line being promoted by the dredger operators on Bear River, to run across the Horst, Drescher, and Durst lands into Wheatland.

BOSTON, Mass.—The petition of the Boston Independent Telephone Company to install its system in this city has been withdrawn. The petition of the Metropolitan Telephone Company for a franchise will probably be taken up shortly after the election.

DALLAS, Tex.—W. H. McGrath of this city has been granted a franchise for a new telephone line extending for some distance between Dallas and Houston. It is his intention to secure the right of way for a long distance line through Texas in the interests of the new company which he represents.

FREMONT, Ia.—At a special election held recently to determine whether or not a twenty-year franchise should be granted the Farmers' and Traders' Telephone Company of Mahaska county, the franchise was granted. Mr. Jenison, the owner of the line, is planning great improvements in the system.

LOUISVILLE, Ky.—The Retail Druggists' Association of this city is anxious to have an ordinance adopted permitting the Home Telephone Company to install pay stations in drug stores in the city. The charter of the Home company does not give it authority to install such stations, while the Cumberland company claims the right. The city attorney will be asked to look into the matter.

JAMESTOWN, N. D.—The city council has granted a franchise to the North Dakota Independent Telephone Company permitting it to conduct a long distance telephone service through Jamestown. The ordinance contains an amendment that the telephone company shall pay a bonus of $2,000 for the privilege. It is stated that the company will decline to accept the franchise on account of the bonus required.

SANTA BARBARA, Cal.—The Home Telephone Company has secured a franchise in Lompoc, and work will be commenced at once. Lompoc completes the list of towns in the county to be taken into the Home system, which includes Santa Maria, Guadalupe, Orcutt, Los Alamos, Los Olivos, Santa Ynez, Ballard, Lompoc, Garey and surrounding country. The company will have telephone communication over the entire county within a short time.

MILWAUKEE, Wis.—By a vote of 45 to 1 the Milwaukee city council recently granted a franchise to the Milwaukee Independent Telephone Company, and a contest of years' duration is brought to a close. There were seven applicants for telephone franchises. The officers of the new company are as follows: President, H. D. Critchfield, Milwaukee; first vice-president, E. A. Wadhams, Milwaukee; second vice-president, C. S. Van Nortwick, Appleton, Wis.; secretary, Clifford Arrick, Indianapolis, Ind.; treasurer, Howard Greene, Milwaukee; directors, John M. Baer, Appleton, Wis.; W. W. Cargill, La Crosse, Wis.; C. J. Chapman, Milwaukee; J. C. Harper, Madison; B. J. Hubbell, Buffalo, N. J.; Alvin P. Kletsch, Milwaukee; George P. Mayer, Milwaukee; Wilmer Sieg, Milwaukee; Richard G. Wagner, Milwaukee; J. B. Whitnall, Milwaukee, and Richard Valentine, Janesville, Wis.

UNDERGROUND CONSTRUCTION

TOLEDO, O.—The Home Telephone Company will place its wires underground.

SOUTH BEND, Ind.—The South Bend Home Telephone Company contemplates doing considerable conduit work.

WINFIELD, Kan.—Telephone poles in the business district of Winfield are to be discarded. All the poles and overhead wires will be taken down and the wires placed in conduits.

INDIANAPOLIS, Ind.—The authorities of Indianapolis have ordered all electric service wires of local companies, whether of high or low tension, to be placed underground in the "mile square" immediately.

DETROIT, Mich.—The Detroit common council has passed an ordinance providing that all telephone, telegraph, signal, feed, and

electric light wires in streets, alleys, and public places within the mile circuit having its center at the city hall shall be placed under ground, and all towers, masts, or poles now in use in such streets shall be taken down.

NEW CONSTRUCTION

McPherson, Kan.—The McPherson Telephone Company will construct additional lines.

Rock Falls, Wis.—Kent Bros. will construct a telephone line from Rock Falls, to Brunswick.

St. Peter, Minn.—The Nicollett County Telephone Company will build an additional country line.

Skillman, Ky.—The farmers of this vicinity have organized a telephone company and will install a line.

Grand Rapids, Mich.—The Citizens' Telephone Company will construct a new building at Reed City to cost $3,500.

Ozona, Tex.—Messrs. Bennett & Midkiff are planning the construction of a telephone line from Ozona to Eldorado.

Ashland, Ore.—Messrs. Spence & Phillips are constructing a new telephone line from this place to Dead Indian country.

Columbus Grove, O.—The Mutual Telephone Company, organized some time ago, will soon begin the construction of its system.

Ann Arbor, Mich.—The Washtenaw Home Telephone Company contemplates the construction of a line from Dexter to Silver Lake.

Rockwell City, Ia.—Geo. F. Scales of Waterloo has been awarded the contract for the Central Mutual Telephone Company's new building.

Clarksburg, W. Va.—The Eureka Pipe Line Company, which has been granted a telephone franchise here, will construct a private telephone system.

Purvis, Mo.—Messrs. Sam Moss and Charles Towns of Purvis will construct a new telephone line from Linn Creek to this place, with Versailles connections.

Norwoon N. C.—The Norwood Telephone Company is extending its lines to Wadesboro and the company will also install exchanges at Ansonville and Cedar Hill.

O'Neill, Neb.—The New Independent Telephone Company announces that it will at once make arrangements to secure or erect four new buildings for its plant.

San Angelo, Tex.—The San Angelo Telephone Company will construct a line from San Angelo to Wall, Tex., and another from Robert Lee to Valley View, Tex.

San Jose, Calif.—State Forester G. B. Hull has let the contract for building a telephone line from Boulder Creek to Governor's Camp in the Redwood Park, in the Big Basin.

Bonnots Mill, Mo.—The Berger Commercial Telephone Company has let a contract to W. R. Durbin for the construction of a telephone line from Bonnots Mill to Linn via Loose Creek.

Omaha, Neb.—It is stated that the Independent Telephone Company has let a contract for the construction of its system in Omaha involving $1,500,000, to the Crescent Construction Company of Portland, Ore.

Binghamton, N. Y.—Negotiations are pending for the purchase of a site by the York State Telephone Company of Elmira, with a view to erecting a large telephone building and central exchange and making it the center of all its telephone lines in this section.

Los Angeles, Cal.—Contract for the new telephone building to be erected by the Home Telephone Company has been awarded to F. L. Spaulding. Work is to be completed by March 1, 1907. The contract price, exclusive of heating, plumbing, and electric work, is $24,528.

Falfurrias, Tex.—The Falfurrias Telephone Company has let the contract for building a telephone exchange in this city and a long distance line connecting Falfurrias and Alice, to C. K. Sweet of Dallas, Tex. The long-distance line will be full metallic copper circuits.

Grass Valley, Calif.—An organization to be known as the Forest Springs Telephone Company has been formed and the construction of the Forest Springs telephone system will begin as soon as the material arrives. Connection will be made with the Grass Valley line.

Fulton, N. Y.—The Oswego County Independent Telephone Company has awarded the contract for the erection of a three-story office building to the contracting firm of Wadsworth & Carver. The contract provides that the building shall be completed by April 1, 1907.

Des Moines, Ia.—The Mutual Telephone Company has purchased a site and will erect a thoroughly modern, two-story, fireproof exchange building, which is to be a branch office. In this new exchange will be installed a central energy relay multiple switchboard having a capacity of 3,000 lines.

Elk Rapids, Mich.—The Citizens' Telephone Company will install an exchange at this place and the same will be in charge of M. F. Butts. The company has purchased the Swaverly telephone line to this place and will rebuild it, using new poles and copper wire. This insures the company an entrance into this village.

Rutland, Vt.—The newly chartered Home Telephone Company will begin the work of constructing its system as soon as the material for the underground conduit work arrives. The new concern plans to put up a handsome building to be occupied by its offices and central exchange. It is the intention to install a thoroughly up to date system.

Thorold, Ont.—The Thorold Board of Trade has appointed a committee to investigate the cost of constructing a local telephone system, and to arrange, if possible, to join with St. Catherines, Merritton, Welland, Niagara Falls, Port Dalhousie and other points in the Niagara district, to combine and build a complete telephone system.

So. Manchester, Conn.—The stockholders of the Bolton and Coventry Telephone Association at a recent meeting decided to construct a number of new lines. It will be necessary to increase the capital stock of the company in order to accomplish this, and a meeting of the stockholders will be held within a short time to decide what action to take.

Ashtabula, O.—A deal has been closed whereby the Ashtabula Home Telephone Company has purchased a site and plans for a new building are now being considered. The style of the structure has not yet been determined, but will be in the near future and it is the intention to build this winter or as soon as weather conditions will permit in the spring.

Hannibal, Mo.—The Quincy Home Telephone Company, of Quincy, Ill., has let the contract for the construction of steel towers which will carry its long distance wires across the Mississippi river connecting with this city. Ten wires will be put on at the start, but the tower will have a capacity of 15 circuits. Connection will be made with the Bluff City Telephone Company in this city.

Fulton, N. Y.—The Oswego County Independent Telephone Company, recently incorporated, will install an up-to-date central energy system with a capacity for two thousand subscribers. It is the desire of the company to give rapid and efficient service, and no expense will be spared in installing the most approved apparatus. Lines will be extended to nearby villages which will give service to the farmers along the route, and the systems now in operation at Palermo, Lysander, Bowens' Corners and Hannibal will be furnished with connection to subscribers of the Independent company in Fulton. The company now has about three hundred and fifty orders for telephones and the number is rapidly increasing.

COMBINATIONS

Quincy, Ill.—All the telephone interests of the county will be merged into one company, which will coöperate with the Home Telephone Company of this city. The present lines will be rebuilt and new lines added.

Haileybury, Ont.—The Temiskaming Telephone Company and the Haileybury & Cobalt Telephone Company have been amalgamated. It is the intention of the present management to carry on considerable extension and improvement work.

EXTENSIONS AND IMPROVEMENTS

Pioneer, S. D.—The Western Mutual Telephone Company will extend its lines.

Fairanks, Ia.—The Home Telephone Company intends to rebuild its exchange at this place.

Miltonvale, Kans.—The County Line Telephone Company is planning important improvements.

Wenatchee, Wash.—The Farmers' Telephone and Telegraph Company will extend its lines to Peshastin.

Passer, Pa.—The Rural Telephone Company of this place is planning many improvements in its system.

Gorham Me.—The Northeastern Telephone Company will place its system at this place in first class condition.

Spring Valley, Ill.—The Spring Valley Telephone Company will make extensive improvements in its system.

Dayton, O.—The Home Telephone Company of this city is planning a number of improvements in its local system.

Syracuse, Ind.—The Syracuse Telephone Company will install a new switchboard and otherwise improve its system.

Atlantic, Ia.—The Musson Telephone Company contemplates making many improvements in its telephone system.

Stromsburg, Nebr.—The Independent Telephone Company of this place contemplates extending its lines to Central City.

West Branch, Mich.—The Northeastern Telephone Company, with an exchange at this place, is preparing to make extensions.

Pomeroy, Ia.—Perry C. Holdoegel, of Rockwell City, secretary and manager of the Mutual Telephone Company, while in the city recently stated that the company contemplates installing cable for

its system in this place, and expects to have the same completed by spring.

METAMORA, Ill.—The Metamora Telephone Company, which has recently overhauled its city lines, will also make improvements in its rural lines.

KITTANING, Pa.—Preparations are being made by the Kittaning Telephone Company to extend its metallic system to Applewold and west Kittaning.

THORNTOWN, Ind.—The Home Telephone Company will improve its system, a car load of poles and other material having been received for the purpose.

SISKIYOU, Ore.—The Siskiyou Telephone Company will at once extend its line from Sawyer's Bar, Cal., to the Gold Ball mine, Lucky Bob mine and the Holman Fosket mine.

DISCO, Ill.—The Farmers' Telephone Company will install a new switchboard. Marvin McKim has been elected president and Burt Garrett secretary and treasurer for the coming year.

CHARLESTON, W. Va.—The Charleston Home Telephone Company contemplates the expenditure of $20,000 in the improvement of its system in Charleston. Its system at Montgomery is also being rebuilt.

SOUTH QU'APPELLE, Sask., Can.—The McMichael Bros. of this place have installed a local telephone system and are now considering the advisability of extending their lines into the surrounding country.

PORTLAND, Ore.—Among the improvements contemplated by the Home Telephone Company, and which it is estimated will cost in the neighborhood of $40,000, is the installation of a new branch exchange with a switchboard of 500-line capacity.

FAIRMONT, W. Va.—The Consolidated Telephone Company contemplates the expenditure of $20,000 in the improvement of its plant in this city. New equipment will be added and the plant will be arranged for a capacity of 3,000 telephones. The present capacity of the plant is only 800.

CLINTON, Ind.—The Indiana Telephone and Telegraph Company of Clinton has decided to make improvements involving the expenditure of $40,000. The separate wires will be taken down and cables will be installed. A new central office will be erected and equipped with modern equipment.

MASON CITY, Ia.—The Western Electric Telephone Company will expend $60,000 in improving its system in this place. The old telephones will be replaced with new ones and the whole system rewired. The company may erect a new building of its own if a fifteen year lease is not obtained from the owners of the building now occupied.

CALAIS, Me.—The Forest Telegraph & Telephone Company, of this city, will install a gasoline engine at its central exchange, according to present plans. The company recently installed a central energy switchboard, and requires power to run the generator. A one or two-horsepower engine will be purchased. D. L. Brehaut is manager of the company.

LANDISBURG, Pa.—At a meeting of the stockholders of the Perry County Telephone Company it was resolved to extend the line of said company to Blain, New Germantown, Oakesburg, via Centre and Kistler, and to Shermansdale, with a possible extension to Dellville and Grier's Point. Adjacent and contiguous territory will also be covered. Bloomfield will be the center of the system. A charter will also be secured and a corporation formed.

SCHENECTADY, N. Y.—The Schenectady Home Telephone Company is getting ready to make extensive improvements. The capacity of the exchange will be greatly increased by the addition of 45,000 feet of new cable, order for which has already been placed. The company can report exceptional growth within the last three months in the number of subscribers. New telephones have been installed to the extent of nearly one hundred per month during that time. As soon as the new cable is installed the company expects to install 150 per month for some time. In addition to the above improvements a Dean four party selective service is being installed.

FINANCIAL NOTES

EAGLE, Wis.—At a recent meeting of the Eagle Telephone Company a 3 per cent dividend was declared.

DELAWARE, O.—The Citizens' Telephone Company has increased its capital stock from $125,000 to $200,000.

MONROVIA, Ind.—The Monrovia Telephone Company has increased its capital stock from $2,000 to $3,000.

ALTAMONT, Ill.—The Effingham County Telephone Company has increased its capital stock from $6,000 to $8,000.

PORTSMOUTH, O.—The Portsmouth Telephone Company has increased its capital stock from $100,000 to $200,000.

ELKHART, Ind.—The Elkhart Independent Telephone Company has increased its capital stock from $1,250 to $2,000.

ELKART, Ill.—G. G. Taylor as secretary of the Elkhart Independent Telephone Company, has filed for record in this county certificate showing an increase in the capital stock of said company from $1,250 to $2,000.

ISHPEMING, Mich.—The Marquette County Telephone Company has increased its capital stock from $60,000 to $100,000.

CHIHUAHUA, Mex.—The Chihuahua Telephone Company has declared a 20 per cent dividend on its capitalization of $30,000.

NEW YORK, N. Y.—The American Independent Telephone Company has increased its capital stock from $100,000 to $500,000.

BUTLER, Pa.—The stockholders of the People's Telephone Company have authorized an issue of $50,000 bonds for improvement purposes.

SAVANNAH, N. Y.—The Savannah Telephone Company has increased its capital stock for the purpose of making improvements in its system.

SANDWICH, Ill.—The stockholders of the Northern Illinois Telephone Company recently declared a semi-annual dividend of 3½ per cent payable January 1.

HEBRON, Ill.—The New Era Telephone Company has declared another quarterly dividend of 3 per cent. The company is now building an exchange at Richmond.

NEWCASTLE, O.—The directors of the New Castle Telephone Company have decided to increase the capital stock of the company to $10,000, and the proposal will be laid before a special meeting of the stockholders in the near future.

MUNCIE, Ind.—The financial report of the Delaware and Madison Counties Telephone Company for ten months of this year shows gross income to be $80,329.36; operating expenses, taxes and insurance, $45,645.51, leaving a net income of $34,683.85.

ROLAND, Ia.—The Roland Mutual Telephone Company has recently declared an eight per cent dividend on the stock of that company and the same is being distributed among the stockholders. This is considered a good dividend for a small company and shows an unusually prosperous condition.

MINNEAPOLIS, Minn.—The directors of the Tri-State Telephone Company have declared the fourteenth quarterly dividend at the rate of 6 per cent per annum. The company under its guarantee will also pay the nineteenth quarterly dividend of the Twin City Telephone Company at the stipulated rate.

CLEVELAND, O.—The United State Telephone Company has is sued a statement showing increases in revenue of four leading stations for October, 1906, over October, 1905, as follows: Dayton, increase 24.8 per cent; Toledo, increase 11.6 per cent; Cleveland, increase 13.5 per cent; Columbus, 28.3 per cent.

BURTON, O.—A statement of the condition of the Burton Telephone Company under date October 31 shows total assets of $32,-170.67. The earnings for the month of October aggregate $537.44 and expenses $421.24, leaving a balance of $116.70. The total number of telephones in service by the company is 479.

LOS ANGELES, Cal.—The Home Telephone Company has raised its rates for business connections twenty-five cents, making the rate $5.25 a month. The reason for the raise is said to be the vastly increased cost for maintenance for the enlarged system and improved service. The company now has 25,000 subscribers.

COUNCIL BLUFFS, Ia.—Directors of the Independent Telephone Company of Council Bluffs offer $10,000 of their guaranteed preferred stock for sale in shares of $100 for January 1. Interest payable 3 per cent April 1, 3 per cent October 1. F. J. Day president

PITTSBURG, Pa.—The statement of the Keystone Telephone Company for the month of October shows gross earnings amounting to $80,848, an increase of $12,273, or about 17 per cent. Nearly one-half of the gross receipts was retained for the net, which increased $5,776. For four months gross receipts gained $30,475, or about 11 per cent.

MELITA, Man., Can.—The Melita-Arthur Telephone Company has applied for supplemental powers under the Manitoba Companies' Acts, for the purpose of increasing its capital stock from $10,000 to $60,000 and authorizing it to extend its lines throughout Manitoba subject to the consent of, and on agreement with the council of any town, village or rural municipality.

NEWARK, O.—The Newark Independent Telephone Company is paying 8 per cent dividends on common stock and 6 per cent on preferred stock. Its bonded indebtedness has been reduced to $30,-000, and the company now has 2,600 subscribers in Newark alone, besides connections with all parts of the country. The stock in this company is held by Newark and Columbus people largely, nearly every dollar's worth of the common stock being owned by Newark business men.

CLEVELAND, O.—The first statement of the earnings of the Cuyahoga Telephone Company since it has been in charge of the new management has been issued for the month of September: Gross earnings for the month were $64,542, an increase of $12,223; net earnings were $30,033, an increase of $9,896, and the surplus for the common stock for the month was $12,165, an increase of $3,275, or at the rate of 9 per cent on the outstanding common stock. The increase in the operating expenses was but $661. The discrepancy

between this and the net earnings arises from the fact that taxes and interest on loans are now deducted before net earnings are given.

CLEVELAND, O.—The statement of the Cuyahoga Telephone Company for October shows the gross earnings were $62,629, an increase of $11,666; the expenses including taxes and interest on loans, $31,116, an increase of $103; the net earnings were $31,513, an increase of $10,962; the fixed charges including interest on bonds and dividends on preferred stock, were $18,430, a decrease of $289; the surplus for the common stock was $13,082, an increase of $11,253 over October of 1905.

CLEVELAND, O.—The report of the earnings of the United States Long Distance Telephone Company of Ohio for October has been issued. The company shows gross earnings of $34,714, an increase of $4,182; expenses $12,360, a decrease of $4,241; net earnings, $22,353, an increase of $8,403; fixed charges $13,559, an increase of $2,067; surplus for the month $8,794, an increase of $6,336; dividends for preferred stock $5,000, leaving the surplus for the month for the common stock 3,794, an increase of $1,336.

ST. JOSEPH, Mo.—To secure a bond issue in the sum of $250,000, the Citizens' Telephone Company has filed its deed of trust to the Commerce Trust Company of Kansas City, covering all of its property in St. Joseph of whatever nature. The deed is signed by Theodore Gary, president of the company. The purpose of the loan as stated in the deed is to provide for the retirement of the present bonded indebtedness as soon as may be, and to provide for funds for making improvements, additions and extensions to the plant. The bonds are to draw 5 per cent interest payable semi-annually, and the company has the right to pay in full at the time of any interest payment.

VERMILION, O.—One of the most prosperous telephone companies of the state is the Vermilion Home Telephone Company, organized five or six years ago. It has a capital stock of $12,700, 5 per cent cumulative preferred and $15,000 common. Dividends have been paid four or five years on the preferred and in the year just closed the company earned 21 per cent on the preferred after maintaining liberally. The preferred stock, which was paid in at par at the organization of the company, represents all of the new money that has gone into the company. The extensions and improvements have been made out of the net earnings of the company after taking care of the 5 per cent dividend on the preferred. The company has 300 telephones in use and will doubtless shortly put out a plan to retire its preferred stock. It is stated that $2,700 preferred stock will be retired with cash and the remaining $10,000 converted into common stock, making a total outstanding common stock of $25,000, upon which dividends at the rate of 6 per cent will be paid.

LINCOLN, Neb.—The Lincoln Telephone Company is sending out circulars to its subscribers announcing an increase in rates. The rates for residence telephones will hereafter be $2 and for business telephones $4. The franchise granted in March, 1903, prescribed a maximum of $2 for residence and $3 for business lines when 1,500 telephones were installed, with the proviso that when 2,500 telephones were in operation an additional charge of 25 cents a month might be made and that the company might at its option increase the rental a like sum for each and every 500 subscribers added thereafter. The rates are now $1.75 for residence and $3 for business telephones. The company has 4,100 telephones operated from the Lincoln exchange. It is claimed that this increase should have been made some time ago, but that action was postponed as long as possible. The system is now about three years old and it is claimed by experts that it is necessary to put by about 7 per cent for the depreciation of the plant. The company at present pays a tax on its gross earnings aside from city, county, and state taxes.

PERSONAL MENTION

NORTH BALTIMORE, O.—Mr. Cyrus Hunt has taken charge of the Home Telephone Company's plant in this place.

MONTEZUMA, Ia.—W. E. McKee has been appointed local manager of the Interior Telephone Company of this place.

OELWEIN, Ia.—John Gustafson has been appointed manager of the Corn Belt Telephone Company's exchange at this place.

VINCENNES, Ind.—H. B. Crandall has been appointed manager of the Knox County Home Telephone Company at this place.

ATCHISON, Kan.—W. H. Marshall, formerly connected with the Atchison Telephone Company, has taken charge of the Effingham telephone system.

TEXARKANA, Tex.—E. J. Jerger has resigned his position with the Grayson County Telephone Company to accept the position of construction foreman for the Texarkana Telephone Company.

ANAHEIM, Calif.—Joseph M. Backs has been appointed manager of the Union Home Telephone Company at this place. The company will begin installing a number of new telephones in the near future.

LOUISVILLE, .Ky.—A change in the management of the Home Telephone Company is proposed. Mr. John A. Armstrong, president and general manager, has expressed a wish to retire from his position at the annual election in February as he does not care to continue in the business longer. It has been decided to divide the position which has heretofore been held by one man, making two offices of it.

PROVO, Utah.—Sam J. Jones, who has acted as solicitor and collector for the Independent Telephone Company of Salt Lake City, has been promoted to the position of manager of the Provo exchange of the same company.

LOUISVILLE, Ky.—Dr. A. D. Jones of this city, who claims to have perfected a device whereby telephonic communication is possible from a moving train, announces that a Chicago company has offered him $100,000 for his invention.

MT. PLEASANT, Ia.—At the meeting of the Southeastern Iowa Telephone Association, recently held at Washington, Ia., Mr. E. E. England of this city was reëlected president. The executive committee will determine the next place of meeting.

ST. JOHNSVILLE, N. Y.—Clarence Pike, formerly of Catskill, has been appointed manager of the Interstate Telephone Company with headquarters at Little Falls. Mr. Pike is arranging for further extension of the Oppenheim telephone line, now under construction.

MOUNT HOLLY, N. J.—Charles S. Horton, formerly in charge of the Interstate Telephone Company in Mount Holly, has been elected general superintendent of the Norfolk and California Telephone and Telegraph Company, with headquarters at Elizabeth City, N. C.

BISMARCK, N. D.—J. W. Murphy has been appointed district manager of the Independent Telephone Company, having charge of the company's affairs from Jamestown to Glendive and from Bismarck to Garrison. Mr. Murphy will also be local manager, with headquarters in this city.

TRANSFERS

MALVERN, Ark.—The Clarkson Telephone Exchange at this place has been purchased by P. Crisby at a cost of $4,000.

ROCHELLE, Ill.—John Babcock and Elmer Slaughter have purchased the property of the telephone company at Flagg Center.

QUAKER CITY, O.—R. S. Deal and Louis Hunt of Spencer Station have purchased the telephone system owned by J. W. Carpenter of this city.

SILVER CREEK, N. Y.—Mr. Hillhouse, of Buffalo, district manager of the Hanover Telephone Company of this place, and Walter Lamphere, also of Silver Creek, have purchased the Brodie telephone line at Evans.

SPOONER, Wis.—The Spooner Telephone Exchange, owned by W. J. Whistle of Hayward, has recently changed hands. More than 100 telephones have been added during the fall, and the future of the system looks brighter than ever.

ROCHESTER, N. Y.—The Century Telephone Company of this city has purchased the General Railway Signal Company of Buffalo for the sum of $250,000. The plant will be moved to this city and the local plant will be more than doubled.

NORTH ADAMS, Mich.—C. E. Knickerbocker, manager of the North Adams telephone exchange, has purchased the Jonesville Independent exchange from Wm. Blauvelt and will operate the same. Mr. Adams will still remain in North Adams.

BRYAN, O.—The Bryan Telephone Company has acquired the telephone exchanges located at Williams Center, Mark Center, Farmer, Sherwood and Ney. The Company will build a number of additional toll lines to take care of its increased business.

WASHINGTON, D. C.—The Telephone Company at Bahia Brazil, hitherto owned by Sr. Pedro Caminha, has been sold to Messrs. Guinle & Co. for the sum of 400,000 milries ($133,333 in gold). The service is to be entirely renovated and a new central office erected.

ORANGE CITY, Ia.—Y. Dykstra of this city has purchased the interurban telephone line, formerly owned by C. L. Wilcox. Mr. Wilcox has purchased a ranch near Billings, Mont., and will locate there as soon as he can dispose of his other holdings in Sioux county.

WINCHESTER, Ky.—The old Kentucky Telephone and Telegraph Company of this city sold its plant and business in this county to the Central Home Construction Company, of Louisville, which will in future have charge of the business here. The price paid is said to have been $100,000.

LEESBURG, Ind.—A deal has been closed whereby the Wilmot Telephone Company has passed into the control of J. E. Armstrong of this place. The system consists of exchanges at Cromwell, Wilmot, and North Webster. The change in management will in no way affect the service given.

CLEVELAND, O.—One of the largest deals transacted of late in the manufacturing district has just been closed by the sale of the entire manufacturing business of the Williams-Abbott Electric Company to the Century Telephone Construction Company of Buffalo. The business will be removed to Buffalo as soon as arrangements can be completed for the new plant in that city. The Williams-Abbott

Electric Company's plant has been leased by the Electric Controller and Supply Company for a term of years, with an option to purchase.

HARDIN, Ill.—The entire property of the Calhoun Telephone Company, consisting of all lines, poles, telephones, switchboards. material on hand. office building and lot in Hardin, including all accounts, was sold at sheriffs sale to satisfy an execution issued by the circuit court of Calhoun county. Stephen McDonald was the purchaser. The price paid was $10,632.68, being the debt and costs. It is stated that a new company will be organized and the lines put in first class condition as soon as possible. It will be the purpose of the new management to give as good or even better service than the old company.

DISKO, Ind.—The Disko & Laketon Telephone Company has purchased the controlling stock of the Akron Telephone Company of Akron, Ind., taking possession of same at once. By this purchase the subscription list of the company has been increased to about seven hundred subscribers. The Akron exchange will have the same officers as the Disko and Laketon company. The purchase includes 100 miles of toll lines which greatly facilitates the toll business in this locality. The officers of the company are as follows: President, Frank Zimmerman; vice-president and treasurer, H. C. John; secretary and general manager, E. L. Harman.

NEWBURGH, N. Y.—The entire plant in this city of the Colonial Telephone Company was recently sold at public auction by William H. Ford of New York, referee. The sale was ordered by the Supreme Court in an action of the Union Trust Company of New York vs. the Colonial Telephone Company. The trust company is the trustee of the bondholders of the company, and the amount of bonds out is said to be $85,000. The property was purchased by Mr. Howard Griswold, of Albany, vice president of the Home Telephone Company of that city, for $15,000. The plant was bought subject to the bonds of $85,000. The sale is said to be a merger with other Independent telephone companies along the Hudson river and at other points in the state. The Home company has already bought the Independent companies at Kingston, Poughkeepsie, Saratoga and Troy. The officers of the company are as follows: President, William H. Caldwell; vice president, William G. Taggart; treasurer, Harry A. Bartlett; secretary and general manager, George G. Otis. It is thought the result of the sale will be a larger and better plant than heretofore. The Colonial plant has been in operation only a few years, its wires are all underground and the plant is regarded as well constructed.

LEGAL ITEMS

DETROIT, Mich.—Edward Hubert has begun suit against the Home Telephone Company for $5,000 damages, alleging that he was injured by driving into an excavation made by the company for the laying of its cables.

MILWAUKEE, Wis.—A bond of $50,000 to insure the building of a local telephone plant has been filed with the city clerk by the Milwaukee Independent Telephone Company. The bond guarantees that work will commence within thirty days and that 5,000 telephones will be in service within two years.

PINE BLUFF, Ark.—In the Jefferson Circuit Court Judge A. B. Grace rendered a decision granting the Telegraphone Company of Arkansas a right of way over the Iron Mountain railway for its poles and wires, incident to proposed long distance service to be inaugurated by Independent telephone companies. The Telegraphone Company is a merger of Independent companies solely for accomplishing long distance service.

LITTLETON, Ill.—Suit has been filed against the Schuyler County Central Mutual Telephone Company of this place for $10,000 damages by J. Warren Black. The suit is the oucome of the death of Mr. Black's little son, who was killed by a telephone pole, which was leaning against the fence, falling on him. The company is a local farmers' line, with headquarters in this village. It is incorporated with a capital stock of $1,200.

NOBLESVILLE, Ind.—Acting on a petition filed in court by Oliver Elliott, Levi R. Pfaff, and Albert Kinzer, Judge Christian appointed the Hamilton Trust Company receiver for the Union and Carmel Mutual telephone companies. The petitioners are stockholders and directors in the companies, which control the telephone business at Carmel, and also own several country lines in that locality. The indebtedness of the two companies amounts to $5,200. The Union company was organized only a few months ago, and has practically absorbed the Carmel Mutual company.

MILWAUKEE, Wis.—The Wisconsin Metropolis Telephone Company, by its attorneys, Bloodgood, Kemper & Bloodgood, has begun proceedings to secure a writ of mandamus to compel the common council to act upon and approve of its plan to erect a telephone system in Milwaukee and to issue the proper permits, or to show cause on January 15, 1907, for failure to obey mandate of the court. No franchise was sought by the company. A permit alone was asked for, the company claiming that no franchise is necessary. George M. Painter is president of the company.

MARION, Ind.—One of the most important decisions that has been rendered in the Grant circuit court for some time was made in the famous Warren telephone case by Judge Paulus recently when he made a special finding of facts in the suit of David H. Griffith and others against John S. Sprowl and others. The decision is in favor of the defendants and is to the effect that the company had the right to sell twenty-seven shares of stock to two people who were not members of the company, and elect a new directorate. The Warren Telephone Company was incorporated March 10, 1904, to operate exchanges in Warren and the counties of Grant, Wells, Huntington and Wabash. At a meeting of the stockholders October 10, 1905, a resolution was introduced stating whereas the company was indebted in the sum of $2,600, the company should issue $2,700 worth of stock, being 27 shares, 17 of which should be issued to George S. Good and 10 to Jonas Good, the proceeds to pay the indebtedness of the company. The directors then proceeded to declare the office of secretary and treasurer vacant and elected L W. Pulley secretary. On October 11 the plaintiffs filed suit in the Huntington circuit court to enjoin the defendants from issuing stock to Good and Good. On November 10th the court dissolved the order and on November 25 the stock was issued to Good and Good. Judge Paulus decides that the company had the right to remove the officers; also that the sale of stock to George Good and Jonas Good was entirely legal and will stand.

MISCELLANEOUS

FAYETTE, Miss.—The telephone exchange at this place was recently destroyed by fire.

EDENTON, N. C.—The question of an Independent telephone system in Edenton is being considered.

EAST DURHAM, Ont.—The Independent telephone lines of East Durham and West Durham have been connected.

VINTON, Ia.—The Vinton and Benton County Telephone Company has just installed 6,000 feet of new cable in this city.

SULLIVAN, Ill.—The Sullivan Telephone Company is making arrangements for better service between Sullivan and Decatur.

VERONA, Miss.—The Independent Telephone Company at this place is rebuilding its plant and making it thoroughly up-to-date.

EVERETT, Wash.—The headquarters of the Farmers' Mutual Telephone Company has been moved to this place from Snohomish.

SHENANDOAH, Ia.—The Independent Mutual Telephone system is being greatly improved under the supervision of Mr. Driftmier.

KARLSBORG, Wis.—The Frey, Karlsborg, Webster Telephone Company has changed its name to the Burnett County Telephone Company.

KANKAKEE, Ill.—The Independent Telephone Company of this city has completed a line to Gilman, where it expects to install a system.

FAIRBANKS, Ind.—The Fairbanks Mutual Telephone Company is erecting a new exchange building which will be occupied about January 1.

COLFAX, Ill.—Mr. Gaddis, proprietor of the Colfax Telephone Company, is experimenting with a new lockout device to be used on party lines.

ABERDEEN, S. D.—After a persistent effort which has lasted several years the Groton-Ferney Telephone Company has at last entered this city.

OMAHA, Neb.—The promoters of the new Independent telephone franchise promise a completed telephone system in operation by January 1, 1908.

JOPLIN, Mo.—The A. Allen Company has completed plans for the telephone exchange building to be erected by the Home Telephone Company of Joplin.

COLLINSVILLE, Ill.—The Kinloch Telephone Company has doubled its business in Collinsville during the summer months and now has over three hundred subscribers.

MONTEVIDEO, Minn.—A new switchboard with all the latest improvements will be installed here at a cost of about $2,000; a new one will also be installed at Watson.

CARIBOU, Me.—During the past month the Aroostook Telephone and Telegraph Company has installed over 40 new telephones in this place, making a total of 401 subscribers.

SHERBROOKE, Que.—The People's Telephone Company of this city, of which Mr. C. Skinner is manager, now has 975 telephones in service and the number is increasing rapidly.

ST. CATHERINE, Ont.—Plans are being considered for the establishment of a municipal telephone system to cover the Niagara district, with central office either in this city or Welland.

PLAINVILLE, Kan.—The Plainville Telephone Company has just completed the remodeling of its plant at an expenditure of about $3,000. The company has about 250 telephones in service.

PENTWATER, Mich.—The meeting of the directors of the Lake Shore Telephone Company was held recently and the report of Manager Thos. Bromley was an encouraging one, the financial state-

ment showing a net gain of about $2,700 from August 1 to November 1.

CAYUGA, Ont.—The Erie Telephone Company expects to have one hundred and fifty telephones in operation before the end of the year and this number will be greatly increased next spring.

NEW ULM, Minn.—At a meeting of the directors of the New Ulm Rural Telephone Company the resignation of L. T. Vogel as secretary was accepted and H. Retzlaff was chosen as manager.

FINDLAY, O.—An effort is being made by farmers residing east of Findlay leading to the building of a telephone line for their use. The company, if organized, will be known as the Farmers' Mutual Telephone Company.

KINGSLEY, Mich.—The Farmers' United Telephone Company has begun operating its lines at this place with seventy-five subscribers. Thirty miles of pole lines have been constructed and also fifty-five miles of double wire lines.

KENOSHA, Wis.—Representatives of the Independent Telephone Company, which secured a franchise in Milwaukee, have been trying to interest the people of this city in a plan for the building of an Independent telephone system.

EDINBORO, Pa.—The Edinboro Telephone Company, a local exchange that has been operating under lease from the Bell company has arranged with the Union Telephone Company for connections with that company after January 1.

NEW LISKEARD, Ont.—The Temiskaming Telephone Company has about 350 telephones in service, of which 200 are in New Liskeard, and has 250 miles of lines which extend to Haileybury and Cobalt, Ont., and Ville Marie, Quebec.

DUBUQUE, Ia.—The Dubuque Telephone Company has constructed a new telephone line into Fort Dodge, which is one of the finest wires strung out of the city. This is the first direct communication the company has had with Fort Dodge.

WEST BEND, Ia.—The West Bend Telephone Company has installed a new switchboard with a capacity of 200 which is a great improvement over the old board. The company has about 200 telephones in service and the number is constantly growing.

PORTAGE LA PRAIRIE, Man., Can.—By a vote of 89 to 16 the Union of Manitoba Municipalities endorsed the government's policy for municipal telephones, and advised the electors of the province to vote in its favor at the coming election on the subject.

HARDIN, Ill.—S. McDonald and S. J. Merida are the managers of the business formerly owned by the Calhoun Telephone Company, which was recently sold at sheriff's sale. It is the purpose of the new management to better the service as rapidly as possible.

KEOKUK, Ia.—Plans for the new building to be erected by the Mississippi Valley Telephone Company will soon be completed by Architect Ratcliffe, when they will be turned over for the inspection of contractors who wish to bid on the construction of the building.

ORONO, Ont.—The Durham Telephone Union, having about 130 telephones on seven lines centering in Orono, recently held a special meeting when it was decided that the necessary steps toward incorporation should at once be taken and the necessary funds be paid in.

IRONTON, O.—R. L. Knapp, manager of the Home Telephone Company, and James E. McDaniels will in the near future place a wooden pin factory in operation here for the purpose of manufacturing wooden pins to be used on telephone and electric light lines.

MILWAUKEE, Wis.—The construction of the plant of the Milwauke Independent Telephone Company will be started as soon as the work of organization is completed and if present plans are carried out the plant will be completed and in operation within twenty months.

MONTPELIER, Vt.—At a recent meeting of the city council it was made known that the Orange County Telephone Company desires to establish a central office in this city owing to the growing demand for the use of its lines. The company will extend its lines considerably.

NEWARK, N. J.—S. V. Granger, an electrical engineer living at Watsessing, N. J., has invented a wireless telephone, which after severe tests has shown that the inventor's system of wireless telepony will transmit the human voice through earth and air without the use of wires.

NORTHWOOD, Ia.—The report of the secretary of the Northwood Telephone Company for the year ending December 1, 1906, shows the total receipts of the company for the year to be $10,744.29. The company operates 171 telephones on its local exchange and 285 on its rural exchange.

BIG SPRINGS, Tex.—The Western Telephone Company, which recently increased its capital stock from $60,000 to $120,000, is extending its system from Big Springs to Abilene, and north and south from the main lines. Copper metallic and iron metallic lines are being installed.

FORT WAYNE, Ind.—The Home Telephone Company is now engaged in erecting a new toll line, consisting of four copper metallic circuits between Fort Wayne and Huntertown, that will connect all the stations on the route, making practically a new long distance line to Garrett, Auburn, and Kendallville. The construction of the line was made necessary by the annoyance caused by the induction from the Toledo and Chicago line, which parallels the toll line.

BARRIE, Ont.—This city is considering a proposition by the Canadian Independent Telephone Company to install a telephone system at the rate of $20 per year for business telephones and $12 for resident telephones, with full connection with rural systems within a radius of eight miles.

IDA GROVE, Ia.—The Farmers' Telephone Company of Quimby and W. F. Hutton of the Holstein telephone system, have reached an agreement whereby the two systems connect at Holstein, and it is thought this will bring the telephone war which has been waged at that place to a close.

GRAND RAPIDS, Mich.—Secretary and Treasurer Kelly of the Independent Telephone Company of Butte, Mont., has been inspecting the Citizens' Telephone Company's system at this place, the Butte company having under consideration what system it will be best to install in that city.

WASHINGTON, Ia.—The Southeastern Iowa Independent Telephone Association recently held its annual meeting in this city. E. E. England, manager of the local telephone company, is president of the organization. Washington claims the oldest Independent telephone company in the state.

PIQUA, O.—The Home Telephone Company has just issued a new directory which shows that the company has 1,424 telephones in service in this city, 141 at Fletcher and 185 at Lena, an increase of 195 since the last directory was issued in September, 1905. A. R. Pollock is manager of the company.

LEAD, S. D.—The Homestake Mining Company will soon have a complete and modern telephone system for its own use. The switchboard will be built with a prospect of having at least 100 telephones. No outside subscribers will be accepted, but it will be for the convenience of the company alone.

EDMONTON, Alba., Can.—The new exchange building for the Edmonton municipal telephone system, plans for which have been completed by the Canadian Machine Telephone Company, Toronto, will have a frontage of 75 feet, and a capacity of 3,000 telephones. It will be a fine two-story brick building.

KANKAKEE, Ill.—At a recent meeting of the directors of the Eastern Illinois Independent Telephone Company it was announced that the company had over 1,500 telephones connected with the local exchange. The whole number of telephones which the company has in operation in this county now is 1,900.

HUTCHINSON, Minn.—Manager W. S. Clay of the Hutchinson Telephone Exchange Company will retain his entire construction crew during the winter months by establishing a camp in the woods of northern Minnesota and getting out a lot of poles for use by the company in the construction of new lines.

ALLENTOWN, Pa.—An agreement has been entered into between the Hotel Allen and the Consolidated Telephone Company whereby the hotel will be equipped with a private branch exchange connecting with the Consolidated system. Sixty telephones will be installed at once and the number will eventually be increased to 150.

WORCESTER, Mass.—The Worcester County Home Telephone Company, through Bullock & Thayer, its attorneys, has deposited with City Clerk Enoch H. Towne $300 as a guarantee of the expense incurred by the city in sending notices to abutters in streets where the company is seeking franchises to lay wires.

SALT LAKE CITY, Utah.—E. L. Sloan, secretary and treasurer of the Utah Independent Telephone Company of this city, states that his company will soon be established in Pocatello and cities in the Upper Snake River Valley, and will shortly have a complete system to the Montana border from Salt Lake and surrounding country.

BEATRICE, Neb.—The New Home Telephone Company has closed a contract with Jackson & Biles for the complete equipment of the Paddock hotel with telephones. Under the arrangement every room in the house will be provided with a telephone through which any part of the city can be reached or long distance connection made.

BUENOS AYRES, Argentine.—The city council has resolved that all wires for messenger call services must be placed underground within six months, under penalty of a fine of $100 for every day's delay thereafter. This will mean that the messenger service will be abolished, as no company can undertake the heavy expenditure involved.

PINGREE, N. D.—The Pingree Telephone Company was organized during the past spring with a capital stock of $50,000 and a franchise was secured for practically all of the northern half of Stutsman county. When the plans of the company are fully carried out our people will have excellent accommodations at very reasonable rates.

FARMINGTON, Minn.—The Star Telephone Company, which has been in operation about three years, has about 700 subscribers. It connects with Hampton and Coates on the east and covers the west end of Dakota county, the east end of Scott county, and a portion of Rice county. The line to Coates has just been completed. A new

line has also been strung from Lakeville to Webster and another from Rosemount to Farmington. E. P. Ruh is manager of the company. The annual meeting of the company will be held in January, at which time reports will no doubt show a good year's business.

FISH CREEK, Wis.—The officers and directors of the Door County Telephone Company have decided not to renew their contract with the Wisconsin Telephone Company, which expires January 30, 1907, and will install their own switchboards and telephones. Roger Eatough of Bailey's Harbor, Wis., has been elected manager of the company.

HUNTINGTON, Ind.—It is probable that the New Long Distance Telephone Company, which has started to build a telephone line from Wabash eastward, will make Huntington its new working terminal for the present. The company has already been granted a franchise for a long distance line through Huntington and will establish a toll station.

RICHMOND, Ind.—Work on the new building of the Home Telephone Company is being pushed as rapidly as possible. The contract calls for the completion of the building and ready for occupancy by the middle of January. Nothing more will be done on overhead work this winter, but work will begin as soon as the spring weather will permit.

GRAND RAPIDS, Mich.—W. B. Woodbury, general manager, and G. M. Lathrop, long distance manager of the Home Telephone Company of Detroit, were in the city recently in conference with Secretary Fisher and General Manager Tarte of the Citizens' Telephone Company in regard to the establishment of tariff relations between the two companies.

CHICAGO, Ill.—At the request of Mayor Dunne the city of Chicago will employ a telephone engineer to look after the city's interest as affected by the pending telephone franchises of the Manufacturers' Telephone Company (Independent) and the Chicago Telephone Company (Bell). A committee has been appointed to select this engineer, of which Mr. Lynn H. Young is chairman.

LACONIA, N. H.—The Citizens' Telephone Company which was recently granted a renewal of its franchise in this city now has exchanges at Laconia, Tilton, Franklin, Meredith, and New Hampton, and toll connections with several Independent companies. The company has 2,500 telephones in service and is capitalized at $100,000. A. W. Abbott is president of the company and W. B. Johnson, manager.

EDMONTON, Alta, Can.—Edmonton now operates 550 telephones at a rate of $30 for business houses and $20 for residences. Receipts last year were $12,942 and expenses $7,165. The old plant will be disposed of as soon as the new is installed. The capital invested by Edmonton in its telephone system is $23,600. Future lines will be placed in underground conduits, and every modern improvement included.

RANTOUL, Ill.—The Coon Brothers Telephone Company, which was recently incorporated in this place with a capitalization of $60,000, has 325 telephones in service and has connection with Dillsburg, Prospect, Dewey, Tomlinson, and Thomasboro, with exchanges in Armstrong, Potomac, Penfield, Collision, Fisher, and Gifford, and the plant is steadily growing. E. G. Coon is local manager of the company.

HARMON, Ill.—Agreement has been entered into with the Home Telephone Company of Dixon by which the Green River Telephone Company, recently incorporated, will gain control by lease, of the line to Dixon. Arrangements have also been made by which the Green River company will purchase the Harmon switchboard and telephones in the village, at a price satisfactory to both parties. Almost all of the stock of the new company has been subscribed.

RICHMOND, Ind.—An agreement is said to have been made between the Home Telephone Company and the two telegraph companies entering the city whereby all three will use the conduits which are being installed by the Home Telephone Company. Negotiations have been in progress for some time. At first the telegraph companies seemed reluctant to consider the plan and, believing that these companies would not act on the matter, the Home company installed the conduits of its own accord.

RICHMOND, Ind.—The Richmond Home Telephone Company's reinforced concrete telephone pole is attracting the attention of telephone and telegraph companies in many parts of the United States. The first pole constructed has been placed in position and the company is preparing to put several others in service. Superintendent Bailey has been deluged with letters from heads of telephone and telegraph companies asking for information, and as a patent on the pole is not possible the information is cheerfully given.

DETROIT, Mich.—Work on the new plant of the Home Telephone Company is progressing rapidly. The superstructure is well under way and the work of building is being carried on faster than the estimates called for. About half a million more dollars than has already been expended will see the completion of the plant. About a million feet of conduit pipe has been laid and 3,500 distributing poles have been placed. It is expected that half a million dollars will be expended on the development of the long distance lines which, when completed will bring them in close touch with the local Independent exchange.

ABILENE, Tex.—The Roberts Telephone & Electric Company of this city continues to make extensions and improvements, having ordered and now in transit material for the erection of a forty mile toll line one and one-half circuit. No. 12 iron, between Abilene and Stamford along the right of way of the Abilene and Northern railroad. Other circuits will be added when necessary. A large force will be put to work on this line and the company hopes to have the same completed and ready for business by the first of the year.

ALLENTOWN, Pa.—General Superintendent West of the Consolidated Telephone Companies has concluded negotiations whereby the consolidated company leases for 999 years the State Belt Telephone Company of Northampton county. The State Belt company has about 500 miles of lines, 900 telephones, and five exchanges, located at Nazareth, Bath, Bangor, Pen Argyl, and Portland. In the spring a line sixteen miles long will be built from Portland to Stroudsburg. The acquisition of this company will connect with the Consolidated territory the entire Pocono region and all its Independent lines along the Lackawanna railroad.

SUNNYSIDE, Wash.—The stockholders of the telephone association have amended their charter, changing the name from the Christian Co-operative Telephone Company to the Yakima Valley Telephone Company, and the plan from a co-operative to a profit sharing. Heretofore the purpose of the company has been to furnish telephone service to its subscribers at cost. Hereafter its purpose will be to furnish telephone service on such a basis as will earn dividends for its stockholders. The following trustees were elected for the coming year: W. P. Sawyer, H. M. Gilbert, J. L. Laughlin, of Zillah; R. D. Young and A. C. Webber of Sunnyside

PUNXSUTAWNEY, Pa.—The Summerville Telephone Company, of which Dr. J. K. Brown of Brookville, is president, and Dr. J. A. Hoover of Summerville is general superintendent, has been solicited by the United Telephone Company, an organization which is capitalized at $25,000,000 and which seeks to control all of the Independent telephone lines in Pennsylvania and adjoining states, to merge with that company, but has refused. During the past two years the Summerville company has expended for extensions and improvements in this place and Lindsey almost $255,000. Almost an equal amount has been spent in Du Bois, besides a considerable outlay in other districts.

GRAND RAPIDS, Mich.—At the regular monthly meeting of the directors of the Citizens' Telephone Company reports showed that the month of November had proven to be the best in the history of the company, the net gain being 128 telephones. December started off well the first day bringing 14 subscribers. Between $30,000 and $40,000 of stock was sold during the month of November, showing the constantly growing demand for stock. Lines between Grand Rapids and Greenville and Grand Rapids and Ionia have been completed within the past 30 days, while lines between Traverse City and Elk Rapids and Traverse City and Kalkaska are now in course of construction.

NEWCASTLE, Pa.—Rates are again being increased in this city by the Bell Telephone Company, which is now charging $30 yearly for telephone service on private lines, instead of the $15 asked when the Citizens' Telephone Company was formed twelve years ago. The people of this city have hope of relief in the completion of the co-operative plan projected by the Newcastle Telephone Company, which was announced by that company some time ago. It is said the plan will be revived shortly after the holidays. More than $65,000 of the $100,000 necessary to its success was subscribed in the summer and it is thought the balance will be very easily secured in the face of the latest raise in rates.

MARLETTE, Mich.—For some time the telephone situation at Marlette has been somewhat strained and it will now come to an issue between the management and patrons by improvements in the service or the withdrawal of a large per cent of the subscribers. A petition is being circulated by the patrons in which they ask an all night service, better day service, by the installation of more country lines, a reduction in rates of business telephones to $20 per annum, and where a subscriber has business and house telephone both at $30. The company's system has been greatly improved and extended during the past season in other sections and will doubtless be in Marlette in the near future.

ALBERT LEA, Minn.—By a combination with several small telephone companies the Tri-State Telephone Company has almost complete possession of the telephone field in Freeborn county. The company has effected arrangements for making connection with the Emmons Telephone Company, the Manchester Telephone Company and the Moscow Telephone Company, which practically cover this part of the state. Negotiations for connection with the Lerdal Telephone Company are now pending, which, if successful, will put the Tri-State company in complete possession of the field. This will give people in this city an opportunity to talk to all sections of the surrounding region over Independent lines.

KOKOMO, Ind.—The city council of Kokomo is getting ready to investigate the consolidation of the local exchanges of the Citizens' and Central Union Telephone companies, effected a short time ago

There is a belief that a complete merger of the two companies has taken place and that the latter company now has control of the telephone situation in this city. It is thought that such a merger has effected a violation of the franchise of the Citizens' company and renders that company's entire equipment liable to be declared forfeited to the city. There is a strong sentiment in favor of the council making a fight for the property and if control of it can be obtained, converting it into a municipal telephone plant.

TERRE HAUTE, Ind.—The Terre Haute *Tribune* is authority for the statement that Hart F. Farwell, secretary of the Kinloch Telephone Company of St. Louis, has completed arrangements by which the general offices of that company will be removed to this city at once and the interests of the company will be conducted from this place as a center. The general offices will be maintained in the new building recently erected here. The Citizens' company is controlled by the Kinloch company, also the Wabash Valley Telephone Company and the systems at Bloomington, Ill., Prairie, Chrisman, Marshall, and many other points throughout eastern Illinois. It is stated that Terre Haute is more centrally located for the management of the business, as St. Louis is too far out of the territory.

GALESBURG, Ill.—The Galesburg Union Telephone Company now has in operation 3,065 telephones, which is more than five times the original number, the company having started with 600 telephones. The company was incorporated in January, 1901, with a capital stock of $100,000 and began service one year afterwards. On July 1, 1902, the capital was increased to $150,000 and a further increase was made January 1, 1906. This last increase gives the company a capital stock of $250,000. The company lately completed a modern, up to date building at a cost of $15,000, in which the equipment cost $20,000. The officers and directors of the company are as follows: President, G. B. Churchill; vice president, Lafayette Weinberg; secretary, H. M. Chase; treasurer, I. S. Callender; general manager, F. C. Woods; directors, E. P. Robson, W. E. Terry, D. L. Peterson, W. E. Phillips, B. F. Arnold, G. L. Price, Nels M. Burgland.

LOUISVILLE, Ky.—It is stated that the Central Home Telephone Company has made a proposition to the stockholders of the Louisville Home Telephone Company to take over the stock of the latter company. The terms of the proposition are said to involve an exchange of securities on the basis of $8,000 5 per cent bonds and fifty shares of stock of the Central Home Telephone Company for each 100 shares of Louisville Home stock. On this basis the Louisville Home stockholders would receive bonds yielding the same amount of interest that the stock is now paying in dividends. The Central Home company is capitalized at $5,000,000 and has an authorized bond issue of $5,000,000. The Louisville Home company is capitalized at $1,310,000. The Central Home company owns a number of Independent plants in southern Indiana and Kentucky, and only last week absorbed the plant at Winchester. Some months ago it absorbed the Kentucky Long Distance Telephone and Telegraph Company.

OELWEIN, Ia.—The Corn Belt Telephone Company has over 400 telephones in this city. Since the exchange has come under the control of the Corn Belt company, vast improvements have been made in the operating department by the installation of the latest improved equipment, making it an up-to-date exchange and having connection with all farmers and local lines extant, reaching the counties of Clayton, Delaware, Buchanan, Black Hawk, Tama, Bremer, Chickasaw, Floyd, Butler and Grundy. The Corn Belt company was incorporated June, 1905, purchasing the property formerly owned by the Cedar Valley Telephone Company. During its existence it has doubled the number of subscribers in the twenty exchanges which it operates, and has rebuilt its exchanges in Waterloo, Oelwein and other places, besides installing miles of copper toll circuits, connecting with a number of important Iowa towns, all of which have the most modern type of equipment. A new switchboard was recently installed in the exchange at this place.

AMHERST, N. S.—A skirmish is going on in Amherst between the Nova Scotia and Cumberland Telephone Companies. Shortly before the amalgamation of the Central Telephone Company and New Brunswick Telephone Company, the Cumberland company obtained a ten years' contract with the former, which gave it connection over all the Central lines. Under the contract it also claims connections over all the New Brunswick lines, and an injunction was placed on the Central restraining the amalgamation of the two companies until the rights of the Cumberland were recognized. The injunction also restrains, it is supposed, the contemplated amalgamation of the Nova Scotia and New Brunswick companies. The Cumberland company, with a capital stock of $20,000, has about 300 telephones in service in Amherst, and throughout the country 200 more. The Nova Scotia Telephone Company, with a capital of $500,000, has about 4,000 telephones in service. Prominent business men express a willingness to back the local company for whatever capital is required.

WASHINGTON, Pa.—Within a short time application will be made to the governor of the state for a charter for a corporation to be known as the State Mutual Telephone and Telegraph Company. This company in its application states that it is the purpose of the organization to operate in Washington, Greene, Fayette, Somerset, Westmoreland, Indiana, Armstrong, Butler, Lawrence, Beaver, and Allegheny counties. It is believed the incorporation of this company will have much effect on the local telephone situation. For the past two years the state Mutual Telephone Company, through its representative, T. B. Lee, has been endeavoring to secure a franchise in Washington borough, but has been refused by the council. About a year ago a franchise was granted the Pittsburg and Allegheny Telephone Company, but the company has made no effort to comply with its requirements, in starting work, and the limit fixed is about up. It is understood that the franchise has been taken over by the State Mutual company, which will probably operate under the name of the State Mutual Telephone and Telegraph Company.

GRAND MANAN, N. B.—The New Brunswick legislature has extended the powers of the Grand Manan Telephone Company Limited. The company is empowered to lay, construct, own, control and operate a telephone cable or submarine wire from the Island of Grand Manan to the Island of Campobello, such cable or submarine connection to be made at or from such point or points on the said Island of Manan and the said Island of Campobello as the said company shall deem most suitable, convenient and expeditious for its purpose; to establish, maintain, operate, conduct and carry on a general telephone business in all its branches, including the building of offices, the setting, erecting and constructing of poles and posts, stringing or putting up of wires, making of connection, buying and selling of telephone instruments, wire and all other fittings, appliances, and apparatus necessarily used and employed in carrying on a telephone business; to make connection with the cable or submarine wires of any company, corporation, individual or the Canadian government, already in existence or which may at any time hereafter be laid.

FARGO, N. D.—The North Dakota Independent Telephone Company of this city has taken over the exchanges and toll lines of seven different North Dakota Independent telephone companies, covering twenty counties and 123 towns. From a small investment—a few thousand dollars—these seven companies have grown so large that the present actual cash value of their combined properties is $550,000. This covers only the value of wires, poles, telephones, switchboards, etc., and does not take into account franchises, right of way, or value of developed business. The company owns and operates more than 2,200 miles of long distance and local telephone lines, with more than 7,000 miles of copper and iron wire, and gives service to more than 4,000 subscribers. The present earnings of the company are $5,000 per month, being nearly twice as much as is required to pay the 7 per cent dividends on all the preferred stock outstanding. To provide funds for new work the company offers for sale 7 per cent cumulative preferred stock—dividends payable semi-annually. The officers of the company are as follows: President, H. R. Lyon; first vice president, James D. Brown; second vice president, Robert Jones; treasurer, E. James Weiser; secretary, A. B. Cox; directors, E. H. Moulton, Alexander Hughes, M. B. Cassell.

NO TELEPHONE IN HEAVEN.

"Now I can wait on baby," the smiling merchant said,
As he stooped and softly toyed with the golden, curly head.
"I want oo to tall up mamma," came the answer full and free,
"Wif your telephone an' ast her when she's tuming back to me.

"Tell her I's so lonesome 'at I don't know what to do;
An' papa cries so much I dess he must be lonesome, too.
Tell her to tum to baby, 'tause at night I dit so 'fraid,
Wif nobody dere to tiss me when the light begins to fade.

"All fru de day I wants her, for my dolly's dot so tored
Fum the awful punchin' Buddy gave it wif his little sword;
An' ain't nobody to fix it since mamma went away,
An' poor 'ittle lonesome dolly's ditt'n thinner every day."

"My child," the merchant murmured, as he stroked the anxious brow,
"There's no telephone connection where your mother lives at now."
"Ain't no telephone in heaven?" and tears sprang to her eyes;
"I fout dat God had ever'fing wif him up in the skies."

—Atlanta Constitution.

Miss Number Plees tried to be gould,
And give the best service she could,
But the patrons exclaimed
That the service they blamed
And she better could do if she would.

Then the owner, a man of stern mould
Said, "These knockers are getting too bould,
This grumbling I'll quell—
Or sell out to the Buell
Then the treatment they'll get will be could."

ITEMS FROM THE RURAL LINE DISTRICTS

Illustrated by O. H. Brandenburg

The new telephone is working nicely.—*Birchardville Correspondent in Montrose (Pa.) Republican.*

The latest is the new telephone which is to be up in a short time.—*Kensington Correspondent in Alliance (O.) Standard.*

The Independent claims the Wisconsin Telephone's Co.'s service in that city is on the bum.—*Delavan (Wis.) Enterprise.*

The Bayard telephone service is good again, much can be said in praise of the new manager.—*Guthrie Center (Ia.) Guthrian.*

The Telephone Company have put up a cable, running the many different wires into the central station.—*London Mills (Ill.) Times.*

George Heisler has been employed by the telephone company to manage the switch for the coming year.—*Mt. Sterling (Ill.) Democrat-Messenger.*

Jacob Richter is setting telephone posts from his place to Dry Bone, connecting to the Union line.—*Snow Bottom Correspondent in Highland (Wis.) Press.*

Dr. J. P. Jackson has just returned from Chicago, where he has been working in the interest of his clock telephone, and reports success.——*Orleans (Ind.) Examiner.*

The Farmers' telephone line is being built as fast as possible. They have the promise of 100 'phones.—*Gilbert Corners Correspondent in Meadville (Pa.) Republican.*

Nunn is to have telephone connection and Editor Hubbell of the Ault Advertiser will be able to call up and have his morning's morning sent down.—*Eaton (Colo.) Herald.*

The telephones in this vicinity are all complete and all are enjoying them. We feel as if we were attached to the world now.—*Ada Correspondent in Howell (Mich.) Herald.*

Silas Holcomb will give up the telephone business next Tuesday. At present writing we can't tell who will be his successor.—*Elkhart Correspondent in Lincoln (Ill.) Courier.*

All the people in this neck of the woods are disappointed that the telephone company did not come out from Kindred this fall.—*Barrie Correspondent in Fargo (N. D.) Forum.*

The people of the Fulton Independent telephone company took down their receivers last Sunday night and heard some fine music.—*East Fulton Corrspondent in Ithica (Mich.) Journal.*

The McMath Telephone Company met Saturday night and disposed of much important business. Four long rings was adopted as everybody's ring or an emergency call.—*Hartsburg Correspondeni in Lincoln (Ill.) Courier.*

The old telephone system was put out of working order yesterday by the crossing of some electric light wires and the telephone wires and burning out the whole system.—*Normal Town Correspondent in Bloomington (Ill.) Bulletin.*

Miss Carrie Reniff, chief operator for several years in the Conneaut Telephone Company's exchange, has resigned as a result of the manager refusing to countenance her objections to peek-a-boo waists. Miss Reniff discharged an operator who appeared at work in summery costume and the manager reinstated her.—*Conneaut Correspondent in Sandusky (O.) Journal.*

Over in Findlay night telephone operators must be 18 years of age or over to comply with the provisions of the curfew ordinance and the other day each and every one of them was compelled to 'fess up to the manager her correct age.—*Tiffin (Ohio) News.*

The Little Sauk Telephone line No. 2 that has been out of order for a whole month is now in excellent shape again and the patrons are all trying to make up for lost time.—*Gordon Correspondent in Long Prairie (Minn.) Leader.*

B. D. Hartley not being able to get posts for the telephone line will be forced to drop it until spring, but will stretch the wires from his place to F. M. Pearson's in a few days.—*Mann Creek Correspondent in Weise (Idaho) Signal.*

Ernest Ketcham, lineman for the Union Telephone Co., fell nearly thirty feet yesterday. His acrobatic skill saved him severe injury, as he turned over in his flight and struck on his feet. He is working to-day.—*Owosso (Mich.) Argus.*

The Elkhorn Central Telephone company had a business meeting at Pleasant Hill school house, Saturday night. M. L. Sandige was elected president, secretary and treasurer, with supreme and absolute power.—*Elkhorn Center Correspondent in Mt. Sterling (Ill.) Republican.*

Frank Grabmaier, formerly with the Colorado Telephone Co., has taken a position with the Sunset Telephone Co. at Lodi, Cal., and George Rule is learning the plumber trade. It won't be very long before both boys are in the millionaire class.—*Central City (Cal.) Advocate.*

The telephone is destined to come to Goodwell Center and our supervisor is back of it this time. That is right. The rural mail is fine, but the telephone is quicker. Good roads and the telephone are the badge of prosperity to any town.—*Goodwell Center Correspondent (delayed) in Newark (Mich.) Republican.*

The telephone people who have been trying to get into town for some time have secured a line that was formerly owned by Hammond and Best, running into the corporation and ending near Mrs. Henry Cunningham's residence. They declare they are coming into the corporation at all hazards.—*Marlinsville Correspondent in Marshall (Ill.) Democrat.*

William O. Schmidt, president of the new hotel company, and Chris Neipp, secretary, have just closed a contract with the Iowa Telephone Company for the installation of the new telephones for the hotel. Each room will be equipped with a 'phone which will be operated by the 5-cent plant. There will be a private branch exchange.—*Davenport (Iowa) Democrat.*

Elam Leary and Mat Roberts, the two telephone linemen, believe in "killing two birds with one stone," or rather, in slaying all the game within sight with a hand axe. Leary and Roberts have been engaged in putting up the new line between here and Milan and came in one day carrying one lone rabbit. But according to the story told by the gentlemen they undoubtedly have an enviable reputation as sportsmen as they claim to have slain eight rabbits and three quails with a common hand axe. Of course, like all good hunters, they are generous hearted and gave all their game away excepting the one rabbit. For further particulars call at the exchange.—*Osgood (Ind.) Journal.*